Forestry Canada
Forêts Canada

Canadian Committee on Forest Fire Management
Comité canadien de gestion des feux de forêt

Canadian Committee on Forest Fire Management

Reports Tabled at
1991 Annual Meeting

Ottawa, Ontario
January 29 - 31, 1992

Canada

93-00202/

CANADIAN COMMITTEE ON FOREST FIRE MANAGEMENT

Reports Tabled at

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FOREWORD

Annual meetings of the Canadian Committee on Forest Fire Management have historically been held in January. For the next three years the meeting will be held sequentially with the Canadian Interagency Forest Fire Centre in November on a trial basis.

The committee is composed of the directors/managers of the forest fire management agencies of the ten provinces and two territories, Parks Canada, and the Canadian Interagency Forest Fire Centre. Other members include: representatives from Forestry Canada, Indian and Northern Affairs, forest industry, the Canadian Forestry Association, forest universities and technical forestry schools. The Committee meets to discuss and take action on forest fire management research issues of national interest.

Whereas minutes of the annual general meeting are given only limited distribution, this booklet of reports of subcommittees, members' reports of their activities, special reports and other material presented at the annual meeting is intended for wider distribution

Enquiries and requests for copies of this booklet should be directed to:

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Winnipeg, Manitoba
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CANADIAN COMMITTEE ON FOREST FIRE MANAGEMENT

EXCHANGE OF INFORMATION REPORTS 1991

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SECTION I

MEMBERS' REPORTS

NEWFOUNDLAND & LABRADOR

NEWFOUNDLAND & LABRADOR

NEWFOUNDLAND AND LABRADOR
1991 FOREST FIRE REPORT

1. GENERAL FIRE SITUATION & STATISTICS

The 1991 forest fire season in Newfoundland and Labrador was below average in terms of the number of fires occurring but was above average in terms of the productive area burnt. The Province recorded 166 fires which burnt a total area of 65,373 hectares. Of this area 9,623 hectares was productive forest land with 97% of this area being in Labrador. The remaining 55,750 hectares was non-productive area with 99% being in Labrador.

Spring conditions in the Province were wet and cool. This trend continued throughout the summer thus giving the below normal number of fire starts. Only one area, the Burin Peninsula, had below average rainfall causing mop up problems on one fire.

The below average season continued until the first week in August when indices started to build in Labrador and lightning activity increased dramatically. Lightning fires followed and contributed greatly to the overall area burnt. Fortunately, much of the area burnt was non-productive forest land.

Of the 166 fires recorded 114 or 69% were mancaused. Fifty-two (52) lightning fires were recorded, forty-eight (48) of which occurred in the Labrador region. Other statistics pertaining to the 1991 fire season can be found in Appendix A.

Under the MARS Agreement Newfoundland loaned the following resources to other member agencies:

CL - 215 to New Brunswick
CL - 215's to Quebec
CL - 215's to Nova Scotia
25 pump units and 625 lenghts of hose to New Brunswick and Quebec

2. AIRCRAFT UTILIZATION

During the past fire season aircraft support included eight provincially operated airtankers - four (4) Cansos and four (4) CL-215's. The Department's Cessna 337 Skymaster was used for detection, birddogging and support activities. In addition four helicopters were contracted and located at bases in St. John's, Gander, Pasadena and Goose Bay. Other helicopters were chartered for fire suppression as and when required.

The Table below presents air tanker statistics for the 1991 fire season. A total of 208 bombing missions were flown by all aircraft. Approximately 12,000,000 liters of water/foam was dropped by CL-215 aircraft and just over 5,000,000 liters of water was dropped by Canso aircraft. A large percentage of CL-215 drops were made out of Province as these aircraft spent a combined total of 78 days or 243.9 hours working in Quebec, New Brunswick and Nova Scotia. Including bombing, ferrying and training a total of 511.5 hours was flown by our Canso aircraft and 650.9 hours by our CL-215's.

TABLE 1

AIRTANKER STATISTICS

MONTH	NO. OF BOMBING MISSIONS	CANSO HOURS	CANSO DROPS	CL 215 HOURS	CL 215 DROPS
APRIL	1	0.0	0	1.0	2
MAY	18	9.0	54	18.0	151
JUNE	66	66.3	475	103.3	635
JULY	53	38.2	273	120.1	719
AUGUST	68	71.1	620	122.1	625
SEPTEMBER	2	0.0	0	2.7	2

TOTAL BOMBING MISSIONS FOR THE SEASON 208
TOTAL DROPS FOR THE SEASON (CANSO) 1738 (1422 ON FIRES)
TOTAL ACTUAL HOURS ON FIRES (CANSO) 184.6
TOTAL DROPS FOR THE SEASON (CL 215) 2455 (2134 ON FIRES)
TOTAL ACTUAL HOURS ON FIRES (CL215) 367.2
TOTAL HOURS FERRYING & TRAINING (CANSO) 326.9
TOTAL HOURS FERRYING & TRAINING (CL215) 283.7
TOTAL HOURS ON AIRCRAFT FOR SEASON (CANSO) 511.5
TOTAL HOURS ON AIRCRAFT FOR SEASON (CL215) 650.9

Additional statistics on number of liters of water/foam dropped and number of hours flown on fire by each aircraft type can be found in Table 2.

TABLE 2

AIRCRAFT UTILIZATION REPORT

1. Fixed Wing

Air Craft Type	No	Hours Bombing Contract + Casual	Litres Dropped Ret./Foam/Water
CANSO PBY	4	184.6	5,171,530
CL - 215	4	367.2	11,641,396

Subtotal Hours: Litres

*	Water
*	Foam
	Long Term
	Short Term

Total *16,812,926

2. Rotary Wing

Aircraft Type	No	Hours Bombing Contract + Casual	Litres Dropped Retardant/Foam/Water
Not Available			

Subtotal Hours: Litres

	Water
	Foam
	Long Term
	Short Term

Total

TOTAL HOURS FLOWN

Fixed Wing	551.8
Rotary Wing	N/A
GRAND TOTAL	551.8

TOTAL LITRES

Water	*
Foam	*
Long Term	
Short Term	
	*16,812,926

3. EQUIPMENT DEVELOPMENT & TESTING

There were no equipment development and testing projects initiated in 1991.

4. FIRE PREVENTION ACTIVITIES

Visitation to schools, youth organizations and service clubs to promote fire prevention, continued as in past years. Activity in this area was particularly evident during National Forestry Week. Smokey the Bear appearances were also quite popular with schools and youth organizations.

During the fire season public awareness messages focusing on the damage caused by forest fires to the Province's forest and recreational resources was initiated by the Department and the N.F.P.A. These messages appear to be reaching their audience as more and more of the Provinces fires are being reported early by the public thus allowing for a quick suppression response.

"Beware and Prepare" public awareness information kits were distributed to our Regional offices during the 1991 fire season. These kits were used to educate the public as to the hazards of wildfire in the wildland/urban interface and to provide information to residents/cottage owners in the protection of their properties.

5. TRAINING

Regional staff provided on the job training to new and returning seasonal fire staff.

A one week Provincial Crew Boss course will be given to seasonal and permanent staff during January, February and March. The course will be given at four locations and approximately sixty (60) candidates will receive this training. Work is continuing on the development of other standardized training packages for other levels in our fireline organization.

Training in our Computerized Fire Management System is ongoing and will continue in 1992.

Three of our Fire Protection Specialists attended a three day information seminar in Fredericton, NB on Fire Behaviour Prediction. The seminar was offered by Forestry Canada and was designed to familiarize fire staff with the principals and workings of the FBP system.

In 1990 the Department purchased a computer course entitled Principals of Fire Behaviour from the Forest Technology School in Hinton, Alberta. The course is designed to instruct staff in all aspects of fire behaviour as they relate to terrain, fuel types and weather conditions. Twenty-five of our senior fire staff participated in this training.

A one week Prescribed Fire course is scheduled for February of this year. Approximately twenty staff are expected to participate.

6. PRESCRIBED FIRE

In 1991 the Department continued to experiment with prescribed fire as a silviculture tool to remove heavy slash and facilitate planting operations. In mid August 189 ha were successfully ignited in Southwestern Newfoundland. The results and the cost of the prescribed fire ($103.40/ ha) was encouraging and it is proposed to move the technology to other areas of the Province in 1992.

As in previous years the Department has also conducted prescribed burns for the Wildlife Division of the Department of Environment and Lands. The purpose of conducting these burns is to improve ptarmigan habtitat in the eastern portion of the Province.

7. PUBLICATIONS, FILMS AND VIDEO TAPES

No new fire publications, films or videos were produced in 1991.

8. ORGANIZATIONAL CHANGES

Mr. Gerald Fleming, Director of Forest Protection took a one year leave of absence commencing in September 1991. Mr. Fleming's duties and responsibilities are being attended to by Mr. Ivan Downton, Director of Silviculture and Research.

9. OTHER ITEMS OF INTEREST TO THE COMMITTEE

During the past year other initiatives have been undertaken in an effort to improve our overall fire management and fire suppression program.

a) Conversion of the Province's fire hose to forged quick connect couplings was completed. Overall the conversion went well and to date a good response has been received from field staff.

b) A new Forest Act was proclaimed which included new Forest Fire Legislation and Regulations. The Act included a provision for a ticket system (similiar to a traffic ticket) which will permit staff to issue tickets for minor infractions of the fire regulations.

c) Additional fire management software packages were added to the computerized Fire Management System.

d) The lazer disk Fire Behaviour training package purchased in 1990 was moved to each Region for a specified period to facilitate training in the area.

e) A number of trials involving foam and ground application equipment was initiated.

10 RESEARCH AND DEVELOPMENT

There was no fire research or development projects conducted by the Department in 1991.

Appendix A

NEWFOUNDLAND AND LABRADOR
1991 FOREST FIRE STATISTICS

TOTAL FIRES

Eastern	51
Central	32
Western	12
Labrador	71
	166

AREA AND FOREST TYPE

Region	Total Area	Productive	Non-productive
Eastern	359.3	20.7	338.6
Central	208.0	85.6	122.4
Western	221.7	135.0	86.7
Labrador	64,584.6	9,382.1	55,202.5
	65,373.6	9,623.4	55,750.2

FIRE OCCURRENCE

Cause	Number	Area Burned
Lightning	52	58,296.4
Resident	42	186.4
Forest Industry	6	5.4
Other Industrial Operations	7	73.7
Incendiary	7	38.5
Railroad	-	-
Recreation	27	268.5
Garbage Dump	9	208.8
Miscellaneous Known	16	6,295.9
Total	166	65,373.6

FIRES BY MONTH

Month	Number of Fires	Area Burned
January	-	-
February	-	-
March	-	-
April	4	1.7
May	33	222.4
June	47	6,960.0
July	18	140.6
August	62	58,015.8
September	2	33.1
October	-	-
November	-	-
December	-	-
Total	166	65,373.6

AREA BURNED BY SIZE

Fire Size	Number	Area Burned
Up to 0.1	62	2.8
0.11 - 1	34	16.7
1.1 - 10	22	85.7
10.1 - 100	22	943.4
100.1 - 1000	14	5,063.4
1000.1 - 10,000	11	42,961.6
10,000.1 - 100,000	1	16,300.0
Total	166	65,373.6

** Areas shown are in hectares

STANDARD CAUSE CLASSIFICATIONS (3 CATEGORIES)

CAUSE OF FIRE

	Eastern	Central	Western	Labrador	Total
Lightning	-	4	-	48	52
Resident	23	8	6	5	42
Forest Industry	1	3	-	2	6
Other Industrial Operations	3	2	1	1	7
Incendiary	3	-	-	4	7
Railroad	-	-	-	-	-
Recreation	13	10	-	4	27
Garbage Dump	3	2	2	2	9
Miscellaneous Known	5	3	3	5	16

RESPONSIBLE GROUP

	Eastern	Central	Western	Labrador	Total
Resident	24	10	10	5	49
Mischance	2	1	2	2	7
Recreation	8	6	-	2	16
Mining Operation	-	1	-	1	2
Forest Industry	-	3	-	2	5
Government Activitie	2	1	-	-	3
Children	11	5	-	9	25
Industrial Operation **	4	1	-	2	7

** There were 52 fires started by lightning - 4 in Central and 48 in Labrador.

MEANS OF IGNITION

	Eastern	Central	Western	Labrador	Total
Match and/or lighter	25	5	8	6	44
Cigarette, cigar, pipe	6	6	1	4	17
Camp Fire	5	7	-	3	15
Chimney Spark	-	-	-	1	1
Explosions	-	-	-	-	0
Power Saw	-	3	-	1	4
Hydro Wire	2	-	-	1	3
Vehicle Fire	2	-	-	-	2
Structural Fire	1	-	1	1	3
Slash and/or debris fire	5	5	2	3	15
ATV	-	-	-	-	0
Heavy Equipment	-	-	-	-	0
Lightning	-	4	-	48	52
Spontaneous Combustion	-	-	-	-	0
Other	5	2	-	3	10

PRINCE EDWARD ISLAND

PRINCE EDWARD ISLAND

EXCHANGE OF INFORMATION - 1991
DEPARTMENT OF ENERGY & FORESTRY
PROVINCE OF PRINCE EDWARD ISLAND

1. GENERAL FIRE SITUATION AND STATISTICS FOR 1991:

Despite a prolonged drought period, the 1991 forest fire season was an average year from the perspective of number of fires. There were 48 fires that burned a total of 119.2 hectares mostly barrens and grass.

Table 1. Summary of Forest Fire Statistics for the 1991 Fire Season on P.E.I.

Cause		Number of Fires	Area Burned (Hectares)
Recreation		0	0
Resident		11	21.9
Forest Industry		2	0.3
Railroads		2	1.8
Other Industry		5	12.65
Incendiary		4	1.5
Miscellaneous		2	1.1
Lightning		0	0
Unknown		22	79.99
	TOTAL	48	119.24

The Department of Energy and Forestry provided equipment and fire fighting support to extinguish the Pisquid River Railway trestle fire.

2. AIRCRAFT UTILIZATION

Nil

3. EQUIPMENT DEVELOPMENT AND TESTING:

The Department ordered forest fire foam equipment and utilized foam on 2 fires this year. Budgetary limitations caused the deferral of the portable tank purchase and quick connect hose conversion.

4. FIRE PREVENTION ACTIVITIES:

The forest fire weather index components were again calculated by the Department of Energy and Forestry this year from the base meteorological data. The numerical rating for fine fuel moisture content, drought code, initial spread index, and the fire-weather index were then conveyed to the District offices for posting and a wildfire danger rating was provided to the local radio stations, Meteo Media, ATV, and MITV through Island Information Services. The fire burning permits were revised to reflect changes in legislation and to include a Beaufort wind scale. A fire closure was imposed on July 5, 1991 and lifted on August 6, 1991 when the severe forest fire weather conditions throughout the province abated.

The television public service announcement was released to the local television stations to encourage the use of the centralized forest fire number and to increase public awareness of forest fire danger.

5. TRAINING:

This department is developing a 2 hour training workshop for volunteer firefighters to better utilize their built-in training structure at the brigade level.

6. PRESCRIBED BURNING:

All forest prescribed burning in 1991 was carried out on mechanically or manually piled brush under the Forest Resource Development Agreement. 150.05 hectares were burned on private land and 43.7 hectares were burned on Crown land. In addition, farmers burned an undetermined area for blueberry production and land clearing.

7. PUBLICATIONS, FILMS, VIDEO TAPES, AND EXTENSION PUBLICATIONS:

The Management Note "Controlling the Burn" was completed and copies of it were provided to individuals wishing to know more about safe controlled burning.

8. ORGANIZATIONAL CHANGES:

On November 8, 1991 the Hon. Roberta Hubley became the Minister replacing the Hon. Barry Hicken who was transferred to Community and Cultural Affairs.

Contracts were again signed with four of the volunteer fire departments operating Department of Energy and Forestry Forest Fire Trucks. The Vernon River Fire Department decided to decline their services this year and the operation of this fire truck was taken over by the Georgetown Fire Department.

9. EDUCATIONAL REPORT AND PARTICIPATION

Basic forest fire suppression training was provided to the members of 3 volunteer brigades and a refresher course was provided to all staff of the Western District. Preparedness field exercises were implemented in all 3 districts. Forestry clerical and administrative staff were provided a lecture on radio fire base and equipment procurement procedures during large fires.

Discussions were initiated with P.E.I. Emergency Measures Organization and Fire Marshall's office on education requirements and mechanisms.

10. OTHER ITEMS - COMMUNICATIONS:

A study was implemented to identify methods to overcome the radio communication problems in a number of areas, particularly in the Eastern District, which are not covered by the integrated mobile radio system.

11. RESEARCH AND DEVELOPMENT PROJECTS:

Forest fire research needs were identified in conjunction with the Atlantic Forest Fire Coordinating Committee and these were discussed with representatives of Forestry Canada Maritimes Region and the Petawawa National Fire Institute. Refer to attached need surveys and status reports.

RESEARCH, DEVELOPMENT AND TECHNOLOGY TRANSFER NEEDS

AGENCY DATE January, 1992

P.E.I. Department of Energy and Forestry

TITLE OR AREA OF NEED

Fire Behavior in Conifer Plantations and Managed Forests

PRIORITY (Check one)

High X Medium ______ Low ______

BACKGROUND

The project arises from discussions of fire research needs by the Atlantic Forest Fire Coordinating Committee and the resolution they provided to and was approved by the CCFFM in 1990.

Forest management alters the vertical and horizontal diversity of natural forests. The impacts of these alterations on fire spread, fire suppression by native hardwood, and other factors is unknown. With sufficient information, it may be possible to design plantations and managed forests that are less susceptible to fire damage or spread.

PROPOSAL OR RECOMMENDATION

Discussions are underway with Forestry Canada - Maritimes Region, the Petawawa National Fire Institute, and the Maritimes provincial Forest Research Advisory Committees.

RESEARCH, DEVELOPMENT AND TECHNOLOGY TRANSFER NEEDS

AGENCY **DATE** January, 1992

P.E.I. Department of Energy and Forestry

TITLE OR AREA OF NEED

Determination and/or testing of fire spread rate equations for forest stand types common in the Atlantic Provinces.

PRIORITY (Check one)

High X Medium ______ Low ______

BACKGROUND

Fire spread equations have been developed primarily in northern or western forest stand types. The forests and weather conditions in the Atlantic Provinces, particularly the Maritime Provinces, are different. Effective use of fire analysis computer packages requires either testing and/or development of fire spread rate equations for these stand types. Forestry Canada has developed a system to record appropriate information to allow field testing and refinement of equations.

PROPOSAL OR RECOMMENDATION

Acquire Forestry Canada regional fire presence. Implement further project field testing. Analyze and compare data.

RESEARCH, DEVELOPMENT AND TECHNOLOGY TRANSFER NEEDS

AGENCY DATE January, 1992

P.E.I. Department of Energy and Forestry

TITLE OR AREA OF NEED

Technology research and transfer on forest fire foams and more efficient fire fighting equipment

PRIORITY (Check one)

High X Medium ____ Low ____

BACKGROUND

The development, testing and standardization of forest fire foams and more efficient fire fighting equipment must be continued if we are to take advantage of these tools. The information of the new and ongoing developments must be conveyed promptly to user agencies.

PROPOSAL OR RECOMMENDATION

Discuss mechanisms and processes at 1992 CCFFM meeting.

RESEARCH STATUS REPORT

AGENCY DATE: January, 1992

P.E.I. Department of Energy and Forestry

TITLE

Analysis of fire spread rates in cold-decked wood biomass on Prince Edward Island

KEY WORDS

fire, cold-deck, biomass, initial attack time.

CURRENT YEAR RESOURCES

Person Years 0.1 Funding 0

TIME TABLE

Starting Date January 1990 Est. Completion Date March 31/92

OBJECTIVE

To determine the response times required to suppress a fire start in cold-decked wood biomass harvest sites.

WORK DONE

Calculation of fire spread rates on various configurations of cold-decked wood biomass.

REPORTS AND OTHER DATA AVAILABLE

Report available on completion.

PROJECT LEADER **YEAR**

Dan McAskill 1992-3

RESEARCH STATUS REPORT

AGENCY **DATE:** January, 1992

P.E.I. Department of Energy and Forestry

TITLE

Analysis of the suitability of the AES weather station network on Prince Edward Island for fire weather analysis.

KEY WORDS

Fire weather, AES, FWI, Prince Edward Island

CURRENT YEAR RESOURCES

Person Years 0.1 Funding 0

TIME TABLE

Starting Date	June, 1990	Est. Completion Date	June, 1992

OBJECTIVE

To determine whether the data collected at AES stations is adequate for the calculation of fire weather indices in Prince Edward Island.

WORK DONE

The locations of all AES reporting stations has been determined as well as the data they collect. 1991 F.W.I. codes extrapolated for 3 districts.

REPORTS AND OTHER DATA AVAILABLE

Not available at this time.

PROJECT LEADER	**YEAR**
Dan McAskill	1992-3

NOVA SCOTIA

NOVA SCOTIA

1991 FIRE SEASON SUMMARY

The 1991 fire season in Nova Scotia was somewhat shorter in duration than usual; the first fires occurring on March 17th, and the last on August 30th, 1991. However, the short season was one of the driest and most hazardous in recent years. Seven hundred thirty three fires burned 1,775 hectares. Fire occurrence continued steadily through July which was a departure from the norm where most fires occur in the late spring. This year in July, 167 fires burned 647 hectares, or 36% of total area burned.

The 1991 season featured little and infrequent rain, below average relative humidities, slightly above average winds, and hence above average fire danger. The high and extreme fire danger prompted the imposition of a Province wide ban on open fires from June 28th, to August 21st, and a Province wide ban on woods travel from July 5th, to August 6th. During the ban on open fires 188 fires burned 652 hectares. Of these, 132 fires occurred during the travel ban and burned 101 hectares. Lightening caused 40 fires in 1991; an increase fo 500% over last year.

CLASSIFICATION OF FIRES BY CAUSE
HECTARES BURNED
12/05/91
TABLE NO. 1

CAUSE	NUMBER	PERCENT NUMBER	HECTARES BURNED	PERCENT HECTARES
FOREST IND	17.00	2.32	162.88	9.18
INCENDIARY	181.00	24.69	414.76	23.36
LIGHTENING	40.00	5.46	17.98	1.01
MISC. KNOWN	87.00	11.87	71.35	4.02
OTHER IND.	22.00	3.00	16.43	.93
RAILROAD	17.00	2.32	114.80	6.47
RECREATION	87.00	11.87	671.21	37.81
RESIDENT	232.00	31.65	260.52	14.68
UNKNOWN	50.00	6.82	45.28	2.55
TOTAL	**733.00**	**100.00**	**1,775.22**	**100.00**

Aircraft:

Our aircraft fleet (4 Hughes 500 ES, 1 Bell 212, 1 Beaver on floats, and 1 Piper Aztec) was used on 151 fires (20.6% of total). The Bell 212 and Helitack Crew were called out on 28 occasions. A CL-215, Sikorsky S-76 and 2 Bell 206 B's, were hired to augment our fleet during July.

1991 AIRCRAFT HOURS FLOWN

AIRCRAFT	DETECTION/ FERRY	WATER BOMBING	TOTAL
4 Hughes 500's	650.7	217.9	868.6
1 Bell 212	40.1	102.4	142.5
2 Bell 206B	7.2	92.4	99.6
1 Sikorsky S-76		84.1	84.1
1 Cl-215	6.4	51.8	58.2
1 Beaver	78.0	29.9	107.9
1 Aztec	174.8		174.8
Totals	**957.2**	**578.5**	**1,535.7**

1991 AIRCRAFT ALERT HOURS (FLEET)

MONTH	RED	YELLOW	GREEN	TOTAL
April	11	122	128	261
May	277	186	151	614
June	456	494	125	1075
July	896	164	50	1110
August	0	136	163	299
September	0	28	40	68
October	0	0	0	
Total	**1640**	**1130**	**657**	**3427**

1. Fixed Wing

Air Craft Type	No.	Hours Bombing		Litres Dropped Ret./Foam /Water
CL-215	1	51.8	Contract: * Casual	0/840,100/1,522,000
Beaver	1	29.9		0/0/121,925

Subtotal 2 Hours: 81.7 Litres 840,100 Foam

Long Term

Short Term

1,643,925 water

Total 2,484,025 litres

2. Rotary Wing

Aircraft Type	No.	Hours Bombing Contract + Casual	Litres Dropped Retardant/Foam/ Water
Hughes 500-E	4	217.9	0/0/2,147,076 litres
Bell 212	1	102.4	0/0/4,315,063 litres
Bell 206B	2	92.4	0/0/1,118,770 litres
Sikorsky S-76	1	84.1	0/0/2,390,060 litres

Subtotal 8 Hours: 496.8 Litres 9,970,969 Water

Foam

Ret. Long Term

Ret. Short Term

Total 9,970,969

TOTAL HOURS FLOWN (Bombing)

Fixed Wing 81.7

Rotary Wing 496.8

GRAND TOTAL 578.5 hours

TOTAL LITRES

Water	11,614,894
Foam	840,100
Long Term	
Short Term	
	12,454,994

Prevention:

Fire prevention presentations at schools as well as tours of the Fire Control and Air Service facilities by various groups of children and adults were made.

This season saw the addition of another television station airing the Fire Weather Index on the weather portion of the evening news. Virtually all of Nova Scotia is now covered.

Radio stations in the Halifax and Truro areas also carried the F.W.I. and forecasts on a daily basis.

Newspaper and magazine ads and articles and radio spots carried the fire prevention message.

A revised comprehensive Industrial Burning Permit was introduced which provided Province wide standards for issuance.

"Smokey the Bear" made 66 appearances this year.

Training:

1991 was busy with respect to training activities. Courses were presented to Department and other suppression agencies at the Shubenacadie training facility and in the subdivision offices. Training courses included: Fire Weather Index, Fire Weather computer training and Fire Behaviour Prediction, First-Aid, Workplace Hazerdous Material Information Systems and Basic Fire Behaviour and Suppression.

A ten part video training package for Fire Departments was purchased from an Ontario outfit and distributed to the subdivisions. This should increase the efficiency of one of our primary suppression forces.

Publications and Videos:

A pamphlet entitled "Safe Burning Guide" was published and distributed Province wide. It details various aspects of safe outdoor burning for residential and recreational purposes.

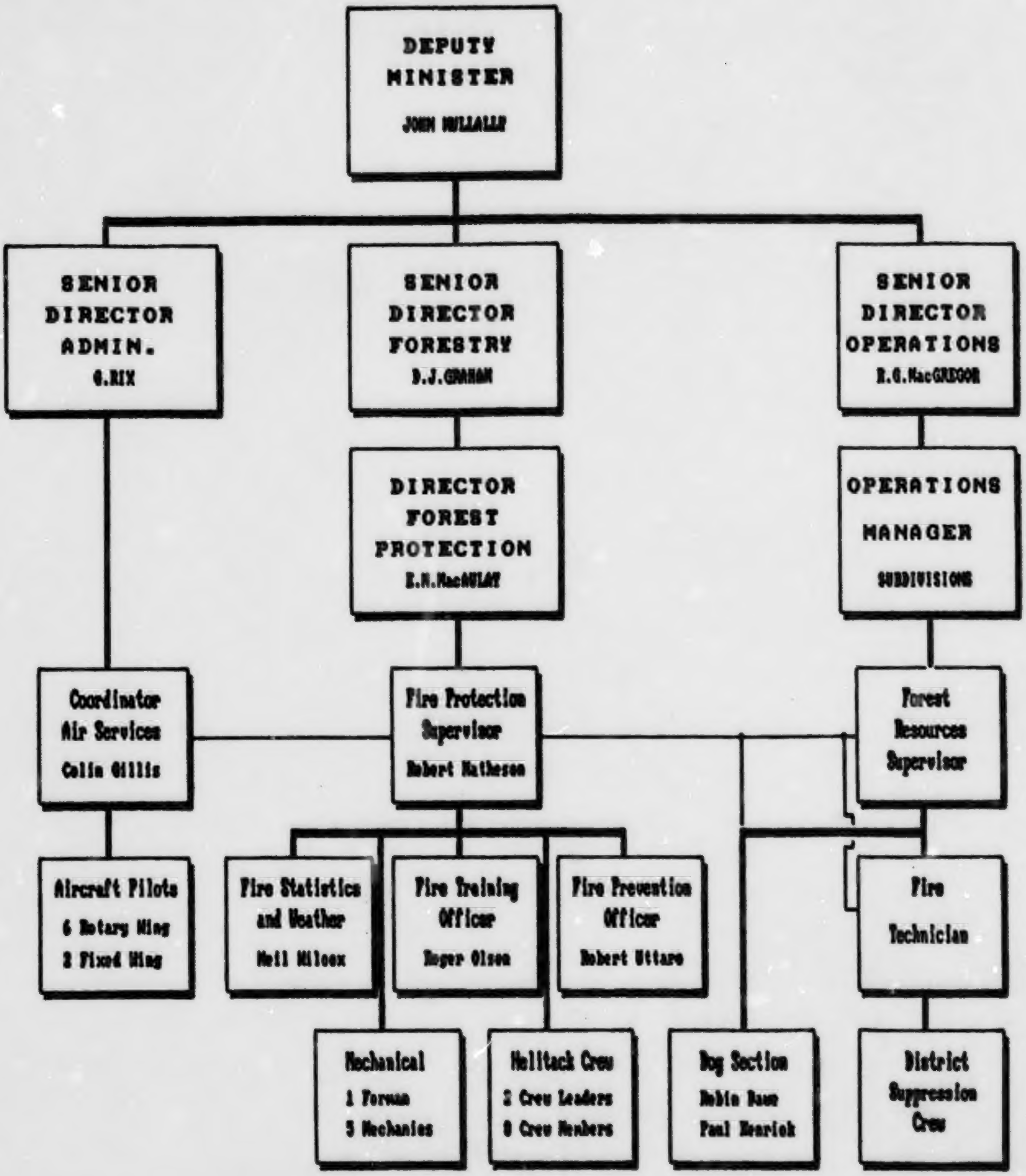
Nine (9) more copies of the "Beward and Prepare" video presentation package were purchased and distributed to the subdivisions as were copies of a Wildfire Suppression Training Video package for Fire Departments.

Other Items:

This year Nova Scotia was pleased to host the joint meeting of the Canadian and United States Forest Fire Equipment Subcommittees Meeting (FFES and FEWT).

DEPARTMENT of LANDS AND FORESTS

NOVA SCOTIA


DEPUTY MINISTER
JOHN MULLALLY
SENIOR DIRECTOR ADMIN.
G.RIX
SENIOR DIRECTOR FORESTRY
D.J.GRAHAM
SENIOR DIRECTOR OPERATIONS
R.G.MacGREGOR
DIRECTOR FOREST PROTECTION
E.N.MacAULAY
OPERATIONS MANAGER
SUBDIVISIONS
Coordinator Air Services
Colin Gillis
Fire Protection Supervisor
Robert Matheson
Forest Resources Supervisor
Aircraft Pilots
6 Rotary Wing
2 Fixed Wing
Fire Statistics and Weather
Neil Wilcox
Fire Training Officer
Roger Olsen
Fire Prevention Officer
Robert Uttaro
Fire Technician
Mechanical
1 Forman
5 Mechanics
Helitack Crew
2 Crew Leaders
8 Crew Members
Dog Section
Robin Bauer
Paul Hearick
District Suppression Crew

RESEARCH NEEDS REPORT

CCFFM MEMBER - RESEARCH. DEVELOPMENT AND TECHNOLOGY TRANSFER NEEDS

AGENCY

DATE ________

Atlantic Fire Management Coordinating Committee

Nova Scotia Department of Lands and Forests

TITLE OR AREA OF NEED

Forest Fire Research/Technology Transfer in the Maritime Provinces

PRIORITY (Check one)

High X Medium ________ Low ________

BACKGROUND

Nova Scotia and the rest of the Maritimes have fire research and development needs that apply to the Maritime's peculiar forest characteristics. To date it appears that most research is only marginally applicable to the Maritimes due to the fact that only Central and Western forest types have been examined.

PROPOSAL OR RECOMMENDATION

Forestry Canada adjust much of its fire research to Atlantic Canadian climatic and vegetative conditions, specifically in the areas of:

(1) Fire Research in Maritime Forest Stands and Fuel Types

(2) Development of fire growth and behaviour model equations for the "new" silviculturally treated forest.

(3) Information regarding prediction of fire impact on the "new" forest and direction to proactively plan stand species changes to serve as wildfire breaks or buffers, e.g. Hardwood Strips.

(4) Research regarding operational guidelines regarding foam in the Maritimes. Where, when, with which equipment, and at what concentration should foam be used. Research regardnig the fate and effect of fire foam on the environment and restricted use guidelines if required.

NEW BRUNSWICK

EXCHANGE OF INFORMATION

NEW BRUNSWICK

1991

The 1991 Forest Fire Season officially started in southern New Brunswick on April 22nd and in the northern part of the Province on April 29th.

The lack of a significant snowpack coupled with dryer than normal weather conditions caused an early start to the spring fire season. Hostile fires began to occur as early as the middle of April.

Fire danger ratings were normal through May; however, June, July and the first half of August saw the ratings rise to high and extreme levels due to generally below normal humidities and higher than normal temperatures and wind speeds. Traditional weather patterns returned later in August reducing danger ratings to normal levels.

There were 656 total fires actioned by the Department in 1991. Of these, 359 were forest fires, which destroyed 3335 hectares of forest land. Three thousand twenty-seven hectares (91%) of the total, was consumed on four fires. The average fire size on the remaining 652 fires was kept to just .47 hectares.

The number of lightning caused fires (85/13%) was well above average (25/5.7%). This was due in part to (i) the higher number and intensity (perceived) of storms; and (ii) the extended dry period which led to high and extreme duff moisture and drought codes.

Six hundred twenty-seven (96%) of the 656 fires occurred during the months of April through August (April-91, May-154, June-150, July-140, August-92.)

Restrictions on industrial operations and open fires were imposed more often and for longer periods than in past years.

In the last few years, an increase in training coupled with a change in suppression philosophy has led to increased levels of preparedness and a decrease in the size of fires under normal conditions.

Number of Wildfires and Area Burned by
General Cause during the 1991 Forest Fire Season.

		FOREST FIRES			
CAUSE	ALL FIRES	NUMBER	PERCENT	AREA	PERCENT
Recreation	39	28	8	84.8	3
Resident	143	73	20	78.6	2
Forest Industry	23	18	5	38.6	1
Railroad	16	9	3	8.5	0
Other Industry	18	14	4	2609.3	78
Incendiary	64	46	13	36.2	1
Miscellaneous	195	36	10	20.2	1
Lightning	85	84	23	60.2	2
Unknown	73	51	14	398.2	12
TOTALS	656	359	100	3334.6	100

Natural Resources and Energy personnel suppressed an additional 297 grass, dump and other fires that burned 236.5 hectares of non-forested land.

AIRCRAFT UTILIZATION:

The 1991 Forest Fire Season was the second year of five year contracts with five aerial detection contractors. The program involved the use of eight Cessna 172 aircraft flying 24 semi-flexible patterns.

Detection aircraft logged 1974 hours on detection patrols and reported 87 fires. The aircraft also flew 52 hours on various forest and game management patrols during periods of low hazard.

The provincial airtanker fleet actioned over 90 fires in 1991 which proved to be the busiest year in New Brunswick airtanker operation history. The average number of fires actioned annually by airtankers in New Brunswick has been in the 30 to 35 range.

Weather conditions remained extremely dry for a three month period, from May 10th to August 10th. The airtanker fire season actually started during the last weekend of April, when a number of fires threatened to escape ground suppression efforts. The air attack organization actioned five fires prior to the normal May 1st contract start.

Numerous small fires were actioned during the last three weeks of May with the largest reaching 50 hectares in size. Most of these fires resulted from escape fires caused by property clean-up activities in or near developed areas. Some of the more remote fires were the result of angling activities or arson.

June proved to be the month in which wildfires caused the most damage. A fire near Heath Steele Mines, northwest of Newcastle, grew to a size in excess of 2500 hectares. This fire escaped initial attack efforts by the mine fire department, Natural Resources and Energy initial attack crews and the total provincial airtanker fleet of nine aircraft. At about the same time, another less serious fire started in the southwestern part of the Province at Mosquito Lake. The fire burned approximately 325 hectares but was held after the initial day's burn. J.D. Irving Ltd. Thrush Commander airtankers actioned this fire on the first day. On the second day, these aircraft were augmented by seven aircraft from the provincial airtanker fleet, two medium helicopters from the State of Maine and a CL-215 airtanker from Newfoundland.

Seven helicopters were used in various roles on the Heath Steele fire. Five of the helicopters were used in air attack, bucketing from water sources in and around the fire area and from a dipping tank in which foam concentrate was added to the water. The helicopters were credited with holding this fire on the 11th of June, when all fixed wing airtankers were sent south to the Mosquito Lake fire. Despite servere burning conditions, aggressive ground suppression action coupled with effective helibucketing prevented further spread of the fire.

The start of the lightning season arrived early in 1991. Lightning caused fires are not usually a problem until late July and August. Airtankers flew almost regularly from June until August 10th. Most of the fires during this time were lightning caused. After August 10th, heavy showers and the passage of Hurricane Bob greatly reduced air attack activity.

New Brunswick used six, PZL, M-18, Dromader airtankers supplied by Norfolk Aerial Spraying Ltd. of Fredericton. Along with the six Dromaders, two Cessna 206 aircraft were used to form the M-18 air attack group. One 206 was used for birddoging while the other was used in a logistics role to move men and equipment to satellite reload bases. The Dromader fleet was hampered by mechanical problems which reduced their effectiveness as a unit early in the fire season.

In 1991, the Grumman TBM Avenger returned to service as an airtanker in New Brunswick. During late 1990 and early 1991, Conair Aviation Ltd. of Abbotsford, British Columbia constructed three new retardant tanks for the TBM airtankers which were installed by Woodlands Aviation of Fredericton early in the Spring. Although delayed slightly by tank installation bugs and pilot training, the TBM aircraft became available for airtanker work early in May. For the remainder of the season, the Avenger proved to be a durable and effective airtanker. The versatility of the two-door tanking system and the effectiveness of the drop patterns allowed the TBM fleet to attack two fires during one mission on a couple of occcasions.

Supplementary airtankers and helicopters were obtained in June from Newfoundland and Maine. Two CL-215 airtankers were obtained from Newfoundland to work on the Heath Steele fire. Unfortunately, one of these aircraft developed engine problems enroute to New Bruswick and was not available for air attack before returning to Newfoundland. The other aircraft was used with good results on both the Heath Steele and Mosquito Lake fires.

Two Bell 205 helicopters from the State of Maine were used effectively in a bucketing role on the Mosquito Lake fire. The presence of numerous lakes and ponds in the area of the fire allowed the two medium helicopters to deliver sufficient drops to control several flare-ups.

The position of Aircraft Coordinator was activated on the Heath Steele fire to provide control of the nineteen aircraft assigned to the fire. The Coordinator worked with the overhead team in assigning work areas for helicopters and bombing targets for both helicopters and fixed wing airtankers. The position enhanced safety and efficiency for the aircraft on the fire.

FIXED WING:

Aircraft Type	No. A/C	Contract or Casual	Bomb Hours	No. Drops	Number of Litres (Retardants are mixed L)
M-18	6	Contract	561.5	504	FT931+FF103 618 620 L
				10	Firetrol 931 12 274 L
					F Foam 103 310 946 L
					Water 110 468 L
				228	
				81*	TOTAL 1 051 948 L
TBM Avenger	3	Contract	294.4	823	FT931+FF103 613 710 L
					Firetrol 931 59 098 L
				270	F Foam 103 177 294 L
				26	Water 59 098 L
				78	
				26*	TOTAL 909 200 L
Thrush	6	Casual	73.2	400	FT931+FF103 36 936 L
					Firetrol 931 6 274 L
				65	F Foam 103 49 438 L
				9	Water 1 705 L
				87	
				3	TOTAL 94 353 L
CL-215	1	Casual	12.7	164	Water/FF103 242 301 L
				62	
TOTALS	17		941.8	1449	2 297 802 L

*Water was loaded at the end of each action to flush tanks, could have been dropped on original fire, a new fire or jettisoned.

ROTARY WING:

Aircraft Type	No. A/C	Contract or Casual	Bomb Hours	Est. No. Drops	Number of Litres (Retardants are mixed L)
B-205	2	Casual	29.0	408	Water 332 928 L
B-206	4	"	126.2	--	IR Scan, Transport
B-206	4	"	183.3	3900	F Foam 103 116 500 L Water 1 600 000 L
AS 350B	1	"	32.3	875	Water 497 218 L
B-204	1	"	6.6	10	Water 9 100 L
H300	1	"	22.3	--	Observation only

EQUIPMENT DEVELOPMENT AND TESTING:

The maintenance of fire equipment continued to be of primary importance.

Large and multiple fires test an organization's capabilities. Forest fires in New Brunswick during the 1991 forest fire season were no exception as our capabilities were indeed exceeded and weaknesses were exposed.

Five, 14 meter (45 foot), former highway trailers were purchased to serve as mobile, multi-use, equipment warehouse and field office facilities.

The value of fire fighting foam as another forest fire suppression tool has been recognized by Natural Resources and Energy officials for a number of years. Four more foam proportioning, four-wheel drive, fire trucks were entered into service in 1991. The effectiveness and versatility of these 350 gallon, one-ton vehicles has led to a program of adding more units to the fleet over the next few years. All units are designed and fabricated by Natural Resources and Energy staff in Fredericton.

As well, 21 of the Department's fleet of 62, conventional, 1000-gallon fire trucks already in service, have been retrofitted to foam proportioning capability. As funds are made available, the remaining fleet of 1000-gallon tankers will be retrofitted with foam proportioning units. All new 300 and 1000-gallon tankers purchased or fabricated since 1990 are equipped with foam proportioning units.

The Department's two Muskeg tankers were also fitted with foam proportioning systems increasing their effectiveness, especially during mop-up.

Natural Resources and Energy staff in all areas of the Province now have the advantage of foam proportioning ground attack equipment at their disposal.

With the cooperation of the Canadian Armed Forces, Natural Resources and Energy is now able to purchase Armed Forces modular field tents. Twenty of these sectional tents have been purchased and have been positively received by fire suppression staff.

Newly designed, self-lay hose bags along with figure 8 hose rollers are now available to fireline suppression personnel so that the bags can be refilled in the field.

FIRE PREVENTION ACTIVITIES:

The 1991 Forest Fire Season was officially declared in April in all daily and most weekly newspapers in New Brunswick. Two 30-second forest fire prevention television advertisements, produced in both official languages, were aired extensively early in the fire season and again during extended dry periods.

No new forest fire prevention material (pamphlets, television spots, etc.) was produced by the Department in 1991.

However, Natural Resources and Energy continued to work closely with the Canadian Forestry Association (CFA) supporting the Smokey Bear program. Considerable fire prevention campaign material was purchased from the CFA and other suppliers and distributed to children and the public. Most of the material was presented personally to children by a uniformed Natural Resources and Energy Forest Ranger during the annual, provincial grade four school visitation program.

There has been a request in some areas for the Department to expand the program to include a grade nine program dealing with careers and natural resource awareness.

The Provincial Forest Fire Centre in Fredericton provided the public with the provincial forest fire hazard twice a day, Monday to Friday through Communications New Brunswick (wire service). Industry and Regional Natural Resources and Energy offices were also provided with the hazard twice a day by either modem or fax. Actual and forecast forest fire danger rating maps were faxed daily to one national and three regional television stations. Through the efforts of the regional television stations and the cooperation of both Nova Scotia and Prince Edward Island, television viewers in the Maritimes were able to visually see the fire weather index in their own province as well as the other two Maritime Provinces.

The public also had the opportunity to telephone a 1-800 toll free number to receive a summary of the Provincial Forest Fire Situation, the forest fire hazard and a forest fire prevention message. These recordings in both official languages, were updated twice a day.

Department of Natural Resources and Energy staff continued to focus more on fire prevention with industrial operations by regularly spot checking and inspecting fire equipment on industrial operations. These inspections have been positive and resulted in a number of recommendations being implemented aimed at improving forest operations.

The 42nd annual Northeastern Forest Fire Protection Commission (Northeast Compact) winter training meeting on forest fire prevention that New Brunswick (Natural Resource and Energy) was to have hosted from February 4th to 7th in Fredericton had to be postponed, due mainly to economic and travel restrictions. This is the first time in Compact history that a meeting has had to be postponed. Although restraints are still in place, the meeting has been rescheduled for February 3rd to 6th in Portland, Maine.

Since the 1989 fire season, key Natural Resources and Energy staff throughout the Province have been issued Transport Canada Railway Inspector certificates (cards) allowing them authority under the Railway Safety Act to enforce the Forest Fires Act in the prevention (vegetation/debris management and burning) and control of fires on or near forest land on which a railway is situated.

TRAINING:

A large number of federal, provincial and industrial forestry personnel were trained on the reverse projection, Compact fire training simulator early in 1991. Training was done at the Fire Centre in Fredericton and at three of the five Regional offices. Innovative ideas and positive results were gained by both the trainers and trainees.

There were various crew and fire boss, as well as general fire suppression refresher courses held throughout the early months of 1991.

A course on photography and plaster casting was held early in the Spring for fire investigators.

There was no Aerial Detection Observers Course held in 1991 due to budgetary restraints and the fact that 12 of 16 returning pilots and observers were veterans.

Numerous District field day suppression exercises were held throughout the fire season as the fire situation and hazard permitted.

There was some basic foam equipment and utilization training carried out, on-site, during some fire situations in 1991. The need for further training in foam and foam use became evident during the fire season.

An Air Attack Officer course was held in May. The course was attended by both veteran and trainee Air Attack Officers.

A fire equipment competition was held in Nackawic, the 1991 Forestry Capital of Canada, in July. Competitive teams were entered from both government and industry. This one day event included pump, hose handling, back tank and tanker events as well as airtanker, helicopter bucketing and helitack demonstrations. The day was a rewarding experience for all teams.

SPECIAL INTEREST:

Three overhauled Grumman TBM Avenger aircraft operated by Forest Protection Ltd., complete with new Conair Aviation Ltd. retardant tanks, were added to the provincial airtanker fleet.

The initial operational success of this initiative coupled with a projected cost benefit of operating TBM airtankers rather than M-18 airtankers has led senior management to convert up to four more TBM aircraft to airtankers by 1993. Two TBM aircraft are being retrofitted for the 1992 fire season bringing the provincial fleet to five TBM airtankers. Cessna 337 aircraft are being used to birddog the airtankers while Cessna 210 and 206 aircraft will be used to transport and support reload base crews.

Resources were at a premium in 1991. Mutual aid requests were both sent and received by New Brunswick through the Northeast Compact and the Canadian Interagency Forest Fire Centre.

Resources Received from:

RHODE ISLAND - hose, personnel
MASSACHUSETTS - bambi buckets
MAINE - hose, pumps, shovels, two Bell 204 helicopters, personnel
NEWFOUNDLAND - hose, pumps, two CL-215 airtankers

Resources Sent to:

MAINE - personnel; portable, long-term fire retardant system
NOVA SCOTIA - hose, pumps, foam
QUEBEC - hose, pumps, highway trailer, personnel

Six bilingual Department of Natural Resources and Energy Forest Rangers were sent to the Betsiamites fire in Quebec on July 19th to serve as crew bosses. This is the first time in almost 30 years that a New Brunswick fire crew has been sent to assist another Province. The opportunity to work with fire personnel in another Province and the experience gained by these men during their 11 days of duty will benefit both the individual and Province.

The largest fire in New Brunswick in 1991, the Heath Steele fire, was caused by a hot catalytic converter. This is the first time in New Brunswick that a forest fire starting from such a cause has been documented.

Eight portable radio interface units purchased in 1990 for use in aerial detection and chartered fixed and rotary wing aircraft were tested during the fire season. The units worked well in aerial detection aircraft; however, minor problems were encountered in the chartered fixed and rotary wing aircraft. Modifications are being made for the 1992 fire season.

A limited number of Natural Resources and Energy staff began self-paced training on the nine lesson, "Principals of Fire Behaviour" laser video disc computer. The number of staff taking this training will increase through 1992.

RESEARCH AND DEVELOPMENT:

With the purchase of the first automatic weather station in 1988, Forest Fire Protection Branch staff quickly saw the benefits that an automated weather data collection system would have for all forestry weather data users in the Province.

Using telemetry and automatic weather stations purchased from Forest Technology System Ltd. of Victoria British Columbia, New Brunswick is continuing a program of setting up remote automatic weather stations (RAWS). Two more RAWS were added to the provincial weather data collection network. Five RAWS are now part of the 48 station weather data collection network. It is hoped two RAWS each year to the data collection network.

The New Brunswick Department of Transportation is assisting Natural Resources and Energy staff in setting up a system that will network present and future RAWS.

Through the efforts of the Atlantic Fire Management Coordinating Committee and Mr. Rob McAlpine, Petawawa National Forestry Institute, a tally sheet was designed on which fire behaviour data from Maritime forest stands and fuel types is recorded. No field data collection was carried out in 1991 due to a number of reasons including high fire dangers and staff assignments.

The delay in assigning a person to Forestry Canada - Maritimes dedicated to fire research, development and technology transfer in Maritime forest stands and fuel types has postponed implementation of this necessary initiative.

ORGANIZATIONAL CHANGES:

The position of Director, Forest Fire Protection Branch was filled by the acting Director, Mr. Donald W. McCormack.

Mr. Joseph A. "Sandy" McKinnon has filled the position of Chief Air Attack Officer.

CCFFM MEMBER RESEARCH, DEVELOPMENT AND TECHNOLOGY TRANSFER NEEDS

TECHNOLOGY TRANSFER NEEDS

AGENCY: **DATE:** January 1991

New Brunswick Department of Natural Resources and Energy,
Forest Fire Protection Branch
Atlantic Fire Management Coordinating Committee

TITLE OR AREA OF NEED:

Forest Fire Research/Technology Transfer in the Maritime Provinces

PRIORITY:

HIGH ☒

BACKGROUND:

New Brunswick and the rest of the Maritime Provinces have fire research and development needs that apply to particular forest characteristics in the Maritimes. To date it appears that most research is only marginally applicable to the Maritimes due to the fact that only Canadian forest types west of the Maritime Provinces have been examined.

PROPOSAL OR RECOMMENDATION:

(1) fire research in Maritime forest stands and fuel types
(2) fire growth and behaviour model equations for the silviculturally treated forest
(3) research requirements and benefits of natural fire breaks
(4) guidelines for the "proper" use of forest fire foams

QUÉBEC

ECHANGE D'INFORMATION
QUEBEC 1991

1 - ÉTAT DES INCENDIES EN GÉNÉRAL ET STATISTIQUES POUR 1991

Dans la zone de protection intensive, 1150 feux ont été relevés, c'est-à-dire 15 % de plus que la moyenne annuelle. Une superficie de 379 861 hectares a été brûlée, c'est-à-dire 9 fois plus que la moyenne annuelle. Les coûts d'extinction se sont élevés à quelque 22 millions de dollars, soit quatre fois ceux d'une saison normale.

Dans les régions de l'Est de la province, le printemps et la première demie de l'été ont été extrêmement secs. Résultat : la saison de 1991 se classe au quatrième rang parmi les plus dévastatrices après 1923 (1 230 000 ha), 1932 (416 000 ha) et 1941 (664 000 ha).

De nombreux feux ont été allumés, en majorité par la foudre, au cours des deuxième et troisième semaines de juin, surtout dans les régions de la Mauricie, du Saguenay - Lac St-Jean et de la Côte Nord. Trois grands feux ont détruit à eux seuls 90 % de la superficie brûlée. L'un d'entre eux s'est étendu sur 42 000 ha à 150 km au nord du lac Saint-Jean. Les deux autres ont détruit 96 400 ha et 201 000 ha sur la Côte Nord.

Etant donné la gravité de la situation, il a fallu recourir à des mesures d'une ampleur peu commune. Ainsi, la circulation en forêt a dû être prohibée pendant trois (3) semaines sur la Côte Nord (du 19 juin au 8 juillet). C'est la plus longue fermeture de forêt au Québec depuis 1955 alors que cette mesure avait été appliquée durant 35 jours, toujours sur la Côte Nord. Il a aussi fallu évacuer des centaines de résidents.

La situation est redevenue normale à la mi-juillet et le restant de la saison fut calme, bien que la situation ait nécessité une surveillance constante.

En plus des nombreux échanges entre les Sociétés de conservation, un record a été établi quant aux emprunts de personnel, d'aéronefs et de matériel d'autres provinces. C'est dans le cadre de l'Entente d'aide mutuelle en cas d'incendies de forêts au Canada qu'ont été importées les ressources suivantes :

- 12 CL-215 équipés d'injecteurs de concentré de mousse (de l'Alberta, la Saskatchewan, l'Ontario et Terre-Neuve);

- 4 aéropointeurs, avec avions d'aéropointage (de l'Alberta, la Saskatchewan et l'Ontario);

- un spécialiste du brûlage contrôlé de nettoiement, un spécialiste du comportement de feu et cinq spécialistes en protection des biens, tous de l'Ontario;

- 6 chefs d'équipes du Nouveau-Brunswick;

- 55 motopompes et 1400 longueurs de 30 mètres de tuyaux du Nouveau-Brunswick, de Terre-neuve et de l'Ontario;

- 100 gicleurs automatiques de l'Ontario.

En plus d'avoir apprécié le professionnalisme des spécialistes de l'extérieur et la qualité des équipements empruntés, le Québec tient à remercier chaleureusement le CIFFC et les provinces qui lui sont venus en aide avec promptitude et efficacité.

Dans les forêts nordiques, qui ne bénéficient pas d'un régime de protection intensive, 61 incendies ont été localisés. Ils ont dévasté environ 58 000 hectares.

L'ensemble des dépenses d'extinction des incendies s'est élevé à quelque 22 millions de dollars.

Les statistiques détaillées sur les incendies en 1991 apparaissent au tableau 1.

2 - UTILISATION D'AÉRONEFS

Les Sociétés de conservation ont requis, pour fins de détection, d'aéropointage et de transport, le nombre d'appareils suivant par voie de contrats d'utilisation exclusive :

- 28 avions (la plupart des bimoteurs);
- 10 hélicoptères légers.

La flotte d'avions-citernes utilisée comprenait 17 CL-215 et 4 Cansos qui ont été opérés à partir de la base principale de Québec et des 9 bases régionales. Le relevé des heures de vol et des largages effectués est présenté au tableau 2. Des hélicoptères légers et moyens porteurs ont effectué de l'arrosage sur les feux, mais le nombre d'heures volées et les volumes d'eau et de mousse largués ne sont pas disponibles.

Le 19 juin, lors de manoeuvres d'extinction qu'ils exécutaient aux commandes d'un CL-215 à environ 150 kilomètres au nord de Chicoutimi, un capitaine et un co-pilote d'avion-citerne ont perdu la vie quand l'appareil s'est écrasé et a été complètement détruit.

3 - MISE AU POINT ET ESSAI D'ÉQUIPEMENTS

Suite aux premiers essais de la minisonde météorologique en 1988, un service météorologique de support aux opérations de lutte a été élaboré. Le technicien en météorologie qui fournit ce service dispose maintenant, en plus de l'équipement de minisondage, d'un ordinateur et d'un télécopieur portatifs, d'une station météorologique automatique et de logiciels spécialisés. Le tout constitue aujourd'hui un service météorologique mobile complet qui peut être utilisé sur le site même d'un brûlage dirigé ou d'un feu d'envergure. De plus, le technicien peut agir comme conseiller auprès de l'officier en devoir au Centre provincial de coordination de la lutte ou dans un des 7 quartiers généraux de lutte régionaux en suivant de près l'évolution des conditions météorologiques lors de situations critiques.

Les premiers essais d'une nouvelle station météorologique automatique entièrement compatible avec le SGPF (système de gestion en protection contre le feu) ont été réalisés à la fin d'octobre 1991. Celle-ci a été créée pour permettre une grande souplesse d'utilisation. Ainsi, d'une part elle est pourvue d'un mât téléscopique mécanique qui en rend possible l'installation par une seule personne, d'autre part, elle est reliée à un ordinateur équipé d'un logiciel capable de recevoir les données en temps réel et de restituer l'information météo désirée, soit en temps réel, soit en différé. De plus, l'information météorologique produite pourra être, soit obtenue sur le site même où la station sera installée, soit transmis par le réseau de radiocommunications existant.

4 - ACTIVITÉS DE PRÉVENTION

Les Sociétés de conservation ont poursuivi l'exécution de leurs programmes usuels de prévention. Ceux-ci font présentement l'objet d'une réévaluation en profondeur dans le cadre de la restructuration en cours du système québécois de protection des forêts contre le feu.

5 - FORMATION

Au niveau provincial, deux sessions de formation en météorologie forestière ont été présentées en janvier et février 1991.

6 - BRÛLAGE DIRIGÉ

Le 3 septembre, un brûlage dirigé a connu un succès complet sur les quelque 13 hectares de plantation d'épinette blanche que la direction du Parc national de la Mauricie avait décidé de retourner à la nature sauvage en utilisant l'un des processus normaux de l'évolution des cycles écologiques : le feu.

7 - PUBLICATIONS, FILMS ET BANDES VIDÉO

Nil.

8 - CHANGEMENTS ORGANISATIONNELS

M. Michel Blanc, gérant de la Société de conservation de la Côte Nord depuis sa création en 1972, a pris sa retraite au mois de février. Depuis lors, M. Jean Girard, gérant de la Société de conservation du Saguenay - Lac St-Jean assume aussi la fonction de gérant de la Société de la Côte Nord.

9 - ÉDUCATION

Rien à mentionnner.

10 - AUTRES SUJETS D'INTÉRÊT

Le Québec avait entrepris l'an dernier une étude approfondie du système de protection des forêts contre le feu. Le rapport du groupe de travail chargé de la réalisation de cette étude a été émis le 31 mars 1991. Ce rapport indiquait, en résumé que pour pouvoir mettre davantage à profit les techniques modernes de prédiction, de détection et de combat, il fallait s'orienter vers une structure unifiée (un seul organisme de protection plutôt que sept) pour augmenter la flexibilité, favoriser la mobilité des ressources et atteindre une plus grande efficacité.

Le futur organisme se dotera d'un centre provincial de lutte dont les actions porteront sur les aspects stratégiques de la planification et du contrôle des opérations. Ce centre aura notamment pour tâche de prévoir les situations et les problèmes et sera à même de dépêcher les effectifs, les aéronefs et les autres équipements vers les endroits critiques.

La lutte sur le terrain continuera de s'effectuer à partir de bases régionales, de bases satellites et de bases d'appoint.

La Fédération des Sociétés de conservation s'est vu confier le mandat de restructurer le système de protection contre le feu en regroupant sous une seule autorité les ressources humaines et matérielles.

L'unification des Sociétés de conservation s'effectuera à compter d'avril 1993.

11 - PROJETS DE RECHERCHE ET DÉVELOPPEMENT

Formulaires (5) ci-joints.

TABLEAU 1/TABLE 1
QUEBEC - 1991

Feux
par cause et par mois
(zone de protection intensive)

-

Fires
by causes and by months
(intensive protection zone)

		Avant mai Before May	Mai May	Juin June	Juillet July	Août August	Après août After August	TOTAL
Foudre	n	-	6	213	139	76	-	434
Lightning	ha	-	116.2	175 617.9	408.0	336.4	-	176 478.5
Ch. de fer	n	1	24	5	4	-	1	35
Railway	ha	4.1	29.0	.7	.4	-	2.0	36.2
Op. for.	n	3	11	15	11	7	2	49
Forest op.	ha	.3	88.8	201 001.9	58.4	-	1.2	201 150.6
Op. indus.	n	4	21	18	9	7	5	64
Ind. op.	ha	.4	75.6	12.3	.4	.2	9.3	98.2
Incendiaire	n	2	5	14	6	8	1	36
Incendiary	ha	2.6	1.1	17.4	4.8	.8	-	26.7
Résident	n	43	80	32	20	10	3	188
Resident	ha	80.3	369.1	14.9	7.3	46.7	-	518.3
Récréation	n	11	69	94	105	36	26	341
Recreation	ha	6.2	727.7	457.7	343.3	4.5	1.0	1540.4
Divers	n	1	-	-	1	1	-	3
Miscellanious	ha	.3	-	-	12.0	-	-	12.3
TOTAL	n	65	216	391	295	145	38	1150
	ha	94.2	1407.5	377 122.8	834.6	388.6	13.5	379 861.2

2 décembre 1991 - données non-finales

UTILISATION DES AVIONS-CITERNES[1]

TABLEAU 2:
ORGANISME: QUEBEC ANNEE: 1991

TYPE	NOMBRE	PROPRIETE DE, SOUS-CONTRAT,	HEURES UTILISEES	MILLIERS DE LITRES LARGUES		
				EAU	MOUSSE 2	TOTAL
CL-215	17	Gouv. du Qué.	2 343	61 244	8 789	70 033
CL-215	2	Alberta	14	11	198	209
CL-215	4	Saskatchewan	67	406	722	1 128
CL-215	3	Ontario	36	80	1 000	1 080
CL-215	3	Terre-Neuve	121	658	2 636	3 294
Canso	4	Gouv. du Qué.	242	4 152	0	4 152
TOTAL	33		2 823	66 551	13 345	79 896

AIR TANKER UTILIZATION[3]

TABLE 2:
AGENCY: QUEBEC YEAR: 1991

TYPE	NO.	OWNED, CONTRACT, CASUAL	HOURS FLOWN	THOUSAND OF LITRES DROPPED		
				WATER	FOAM[4]	TOTAL
CL-215	17	Quebec Gvt.	2 343	61 244	8 789	70 033
CL-215	2	Alberta	14	11	198	209
CL-215	4	Saskatchewan	67	406	722	1 128
CL-215	3	Ontario	36	80	1 000	1 080
CL-215	3	Terre-Neuve	121	658	2 636	3 294
Canso	4	Quebec Gvt.	242	4 152	0	4 152
TOTAL	33		2 823	66 551	13 345	79 896

1 Données pour toute la province (la zone de protection restreinte incluse)
2 Volume du mélange avant la dilatation
3 Data for whole province (including restricted protection zone).
4 Volume of the mixture before expansion

PROJETS DE RECHERCHE ET DÉVELOPPEMENT
ET DE TRANSFERT TECHNOLOGIQUE
DES MEMBRES DU CCGFF
RAPPORT DE DÉBUT, D'ÉTAPE OU DE FIN

ORGANISME — DATE 28 novembre 1991

Province de Québec

TITRE

Détecteur infrarouge aéroporté de feux de forêts

RESSOURCES AFFECTÉES PENDANT L'ANNÉE COURANTE

Années-personnes contractuel — Fonds 200 000 $

ÉCHÉANCIER

Date de début Janvier 90 — Date de fin Décembre 91

OBJECTIF

Mise au point d'un système de détection infrarouge à bas prix qui puisse être fixé sur un avion conventionnel utilisé en protection contre le feu, particulièrement quand la visibilité est mauvaise.

TRAVAIL ACCOMPLI

Le prototype du détecteur FL-30, construit par la compagnie BOMEM a été testé en situations simulées et réelles en août et septembre. Les résultats sont favorables. Il reste à établir l'angle de vision à utiliser lors des missions réelles de détection.

RAPPORTS ET AUTRE INFORMATION DISPONIBLE

Un rapport sera produit à la fin des travaux et l'instrument fera l'objet d'une publicisation par le promoteur et le fabricant.

CHARGÉ DE PROJET — ANNÉE 1991-1992

Fédération des Sociétés de conservation

PROJETS DE RECHERCHE ET DÉVELOPPEMENT
ET DE TRANSFERT TECHNOLOGIQUE
DES MEMBRES DU CCGFF
RAPPORT DE DÉBUT, D'ÉTAPE OU DE FIN

ORGANISME — DATE 28 novembre 1991

Province de Québec

TITRE

Radar de précipitations

RESSOURCES AFFECTÉES PENDANT L'ANNÉE COURANTE

Années-personnes 1,0 Fonds -

ÉCHÉANCIER

Date de début Février 1989 Date de fin Septembre 1992

OBJECTIF

Fabriquer et intégrer au système informatisé de gestion en protection des forêts, un radar de précipitations à bas prix dans le but de détecter en continu les zones de précipitations disséminées.

TRAVAIL ACCOMPLI

L'appareil construit et vérifié en 1991 est considéré comme opérationnel. Deux exemplaires additionnels ont été fabriqués et seront installés en réseau en 1992 par la Société de conservation de l'Outaouais et le CTTM.

RAPPORTS ET AUTRE INFORMATION DISPONIBLE

Pour information, contacter le CTTM ou la Société de conservation de l'Outaouais.

CHARGÉ DE PROJET — ANNÉE 1991-1992

Société de conservation de l'Outaouais.

PROJETS DE RECHERCHE ET DÉVELOPPEMENT ET DE TRANSFERT TECHNOLOGIQUE DES MEMBRES DU CCGFF

RAPPORT DE DÉBUT, D'ÉTAPE OU DE FIN

ORGANISME

DATE 28 novembre 1991

Province de Québec

TITRE

Mousse extinctrice pour les feux de forêts

RESSOURCES AFFECTÉES PENDANT L'ANNÉE COURANTE

Années-personnes -

Fonds -

ÉCHÉANCIER

Date de début Novembre 1986

Date de fin 1991

OBJECTIF

Déterminer si le Québec devrait équiper ses CL-215 de système d'injection de moussant pour le largage de mousse lors des opérations régulières d'attaque aérienne des feux de forêt.

TRAVAIL ACCOMPLI

L'utilité de la mousse est démontrée. L'information obtenue sur les effets de la mousse sur l'environnement et la santé humaine permet de définir les règles d'utilisation opérationnelle de la mousse. Tous les avions-citernes du Québec seront équipés d'injecteurs en 1992.

RAPPORTS ET AUTRE INFORMATION DISPONIBLE

Analyse documentaire sur les agents moussants utilisés dans la lutte aérienne contre les feux de forêt. Les rapports d'étape concernant l'effet des mousses sur l'environnement et la santé humaine sont disponibles au SPCF.

CHARGÉ DE PROJET

ANNÉE 1991-92

Service de la protection contre le feu (SPCF).

PROJETS DE RECHERCHE ET DÉVELOPPEMENT
ET DE TRANSFERT TECHNOLOGIQUE
DES MEMBRES DU CCGFF
RAPPORT DE DÉBUT, D'ÉTAPE OU DE FIN

ORGANISME DATE 28 novembre 1991

Province de Québec

TITRE

Aide à la navigation aérienne par satellite

RESSOURCES AFFECTÉES PENDANT L'ANNÉE COURANTE

Années-personnes - Fonds -

ÉCHÉANCIER

Date de début Avril 1991 Date de fin 1993

OBJECTIF

Vérifier la pertinence d'équiper les aéronefs utilisés en protection contre le feu d'appareils de localisation automatique basés sur le Global Positioning System (G.P.S.)

TRAVAIL ACCOMPLI

Des tests ont été effectués à l'aide d'une unité de EPS-800, laquelle sert d'interface entre le GPS et le pilote. Il y a beaucoup de travail d'ajustement à faire. D'autres essais sont prévus en 1992 et des développements spécifiques sont anticipés.

RAPPORTS ET AUTRE INFORMATION DISPONIBLE

-

CHARGÉ DE PROJET ANNÉE 1991-1992

Service de la protection contre le feu

**PROJETS DE RECHERCHE ET DÉVELOPPEMENT
ET DE TRANSFERT TECHNOLOGIQUE
DES MEMBRES DU CCGFF
RAPPORT DE DÉBUT, D'ÉTAPE OU DE FIN**

ORGANISME DATE 28 novembre 1991

Province de Québec

TITRE

Remotorisation des avions-citernes CL-215

RESSOURCES AFFECTÉES PENDANT L'ANNÉE COURANTE

Années-personnes - Fonds -

ÉCHÉANCIER

Date de début 1994 Date de fin 2000

OBJECTIF

Moderniser le groupe propulseur du CL-215 en le remplaçant par un moteur récent plus puissant, plus fiable et moins coûteux à opérer.

TRAVAIL ACCOMPLI

Le prototype CG-AWQ du CL-215T a effectué des démonstrations opérationnelles en situation de feux réels pendant la saison 1991. Les commentaires ont été positifs. Deux appareils CL-215T seront intégrés à la flotte du Québec en 1992.

RAPPORTS ET AUTRE INFORMATION DISPONIBLE

-

CHARGÉ DE PROJET ANNÉE 1991-1992

Service aérien gouvernemental.

EXCHANGE OF INFORMATION
QUÉBEC 1991

1 - FIRE AND STATISTICS FOR 1991

Within the intensive protection zone, 1150 fires were recorded, that is, 15 % more than the annual average. An area of 379 861 hectares was burnt, which is approximately four times the annual average.

Spring and the first half of the summer were extremely dry in the Eastern regions of the province. Result : 1991 ranks fourth among the most devastating seasons, after 1923 (1 230 000 ha), 1932 (416 000 ha) and 1941 (664 000 ha).

Numerous fires, mostly lightning fires, occurred during the second and third weeks of June, mainly in the Mauricie, Saguenay - Lac St-Jean and North Coast areas. Three large fires destroyed 90 % of the burnt area. One of them covered 42 000 ha at 150 km north of Lac Saint-Jean. The two others destroyed 96 400 ha and 201 000 ha on the North Coast.

Owing to the seriousness of the situation, it was needed to resort to very exceptional measures. Thus, the forest had to be closed for three (3) weeks on the North Coast (June 19 to July 8). It was the longest forest closure in Quebec since 1955 when it lasted 35 days in a row, on the North Coast too. Also, hundreds of residents had to be evacuated.

The situation returned to normal at mid-July and the remaining of the season was quiet although requesting close watch.

In addition to the numerous exchanges between the Sociétés de conservation, a record was established regarding personnel, aircrafts and equipment loans from other provinces. The following resources were imported within the Mutual Aid Resource Sharing agreement :

- 12 CL-215 with foam injectors (from Alberta, Saskatchewan, Ontario and Newfoundland);
- 4 bird-dog officers with aircrafts (from Alberta, Saskatchewan and Ontario);
- a burnout specialist, a fire behavior specialist and a specialist in protection of goods, all from Ontario;
- 6 crew bosses from New Brunswick;
- 55 pumps and 1400 30 meters lenghts of hose from New Brunswick, Newfoundland and Ontario;
- 100 automatic sprinklers from Ontario.

Quebec appreciated the professionalism of the personnel and the quality of the equipment loaned. Likewise, Quebec warmly thanks CIFFC and the provinces which helped us promply and efficiently.

In northern forests, which do not benefit from an intensive fire protection plan, 61 fires were located. They destroyed some 58 000 hectares.

The extinguishing costs amount to a total of some 22 million dollars.

Detailed statistics on the 1991 fires are shown in Table 1.

2 - AIRCRAFT UTILIZATION

The forest fire management organizations requested, by exclusive contracts, the following number of aircraft for detection, birddogging and transportation purposes :

- 28 airplanes (mostly twins);
- 10 light weight helicopters.

The airtankers fleet consisted of 17 CL-215 and 4 Cansos operated from the main base in Quebec City and the 9 regional bases. Data on hours flown and number of drops are shown in Table 2.

Light weight and medium weight helicopters worked on fires with buckets, but data on the number of hours flown and the quantities of water an foam that were dropped are not available.

On June 19, while executing extinguishing manoeuvres with a CL-215 at approximately 150 kilometers North of Chicoutimi, an airtanker pilot and his copilot died when the plane crashed and was entirely destroyed.

3 - EQUIPMENT DEVELOPMENT AND TRIALS

After the first trials of the minisonde in 1988, a meteorological service to support firefighting operations was elaborated. The weather technician who provides the service now has at his disposal, in addition to the minisounding equipment, a portable computer and a portable Fax, and automatic weather station and some specialized softwares.

Altogether, it forms now a complete mobile weather service that can be used on the site of a prescribed burn or of a major fire. More, the weather technician may act as advisor to the officer on duty at the Provincial Fire Center or at one of the 7 Regional Fire Centers by closely monitoring the evolution of the weather conditions during critical situations.

The first trials of a new automatic weather station, entirely compatible with the SGPF ("système de gestion en protection contre le feu"; computerized fire management system), took place in October 1991. It was put together to allow for more utilization flexibility. So, on the one hand, it has a mechanical telescopic mast which makes possible the installation by a single person, on the other hand, it is linked to a computer which is equipped with a software able to receive data in real time and to supply desired weather data in real time or upon request. The resulting weather data will be available directly on site or transmitted through the existing radio network.

4 - PREVENTION ACTIVITIES

Regular prevention programs were carried on by the forest fire management organizations.

These programs are at the present time going through a complete reappraisal which is part of the current restructuration process of the provincial fire management system.

5 - TRAINING

At the provincial level, fire weather training sessions were presented in January and February 1991.

6 - PRESCRIBED BURNING

On September 3, a prescribed burn was a complete success on 13 hectares of white spruce plantation that the managers of Mauricie National Park had decided to turn back to wild nature through the use of fire, which is one of the natural evolution processes of the ecological cycles.

7 - PUBLICATIONS, FILMS AND VIDEO TAPES

Nil.

8 - ORGANIZATIONAL CHARTS - CHANGES

Mr. Michel Blanc, manager of the Société de conservation de la Côte Nord since its creation in 1972, retired in February. Since then, Mr. Jean Girard, manager of the Société de conservation du Saguenay - Lac St-Jean simultaneously assumes the position of manager of the Société de conservation de la Côte Nord.

9 - EDUCATION

Nothing to be mentioned.

10 - OTHER ITEMS

Quebec had undertaken last year a complete study of its forest fire protection system. The work group mandated to realize the study tabled its report on March 31, 1991. In short, the report was pointing out that, to enable the best use of modern prediction, detection and firefighting techniques, the system should comprise one united structure (one protection organization instead of seven). Thus, flexibility would be better, ressource mobility would be favored and the result would be a greater efficiency.

The future organization will endow itself with a Provincial Fire Center which will deal with the strategic aspect of operations planning and control. That Center will have in particular the task of foreseeing situations and problems and of dispatching manpower, aircrafts and equipment to critical areas.

Field firefighting will keep being carried out from regional, satellite and occasional bases.

The Federation des Sociétés de conservation has been mandated to restructure the forest fire protection system by regrouping human and material resources under one sole authority.

The unification of the Sociétés de conservation will begin in April 1993.

11. RESEARCH AND DEVELOPMENTS PROJECTS

Forms (5) joined.

Research Status or Completion Report

Agency: Province of Quebec

Date: November 28, 1991

Title: Airborne Infrared Forest Fire Detector

Key Words: Infrared, Detection, Fire Detection.

Current Year Resources:

Person Years: Contractual

Funding: 200 000 $

Timetable:

Starting Date: January 1990

Completion Date: December 1991

Objective: To develop a low-cost airborne infrared forest detector to be strapped-on to regular aircraft used in forest fire protection, specially in times of low visibility.

Work Done: FL-30 prototype, built by BOMEM company, has been tested in simulated in real situations last August and September. Results were favorable. The vision angle to be used in real missions has now to be settled.

Reports and Other Data Available: Report to be produced at the end of the project. The device will then be publicized by the project leader and the maker.

Project Leader: Fédération des Sociétés de conservation.

Year: 1991-1992

rrf\f-status

Research Status or Completion Report

Agency: Province of Quebec **Date:** November 28, 1991

Title: Precipitation Radar

Key Words: Radar, Rain Measurement, Detection of Precipitation, Fire Weather.

Current Year Resources:

Person Years: 1,0 **Funding:** -

Timetable:

Starting Date: February 1989 **Completion Date:** September 1992

Objective: To build and integrate to the Quebec computer based Fire Management System a low-cost precipitation radar for the purpose of detection on a continuous basis of scattered precipitation areas.

Work Done: First unit built and tested in 1991 is considered as operational. Two other units have been built and will be set up in network in 1992 by the Société de conservation de l'Outaouais and the CTTM.

Reports and Other Data Available: For information, communicate with the CTTM or the Société de conservation de l'Outaouais.

Project Leader: Société de conservation de l'Outaouais **Year:** 1991-1992

Research Status or Completion Report

Agency: Province of Quebec

Date: November 28, 1991

Title: Forest Fire Foams

Key Words: Foam, Foaming agent, Retardant

Current Year Resources:

Person Years: -

Funding: -

Timetable:

Starting Date: November 1986

Completion Date: 1991

Objective: To determine whether Quebec should equip its CL-215 with inboard foaming agent injectors to drop forest fire foams in its regular aerial fire fighting operations.

Work Done: Foam usefulness has been demonstrated. Data that has been gathered regarding foam effects on environment and human health permit the definition of the rules for operational use of foam by the CL-215. In 1992, all Quebec's CL-215 airtankers will be equipped with injectors.

Reports and Other Data Available:
- Analyse documentaire sur les agents moussants utilisés dans la lutte aérienne contre les feux de forêt.
- Progress reports relating to foams effects on the environment and human health are available at the SPCF.

Project Leader: Service de la protection contre le feu

Year: 1991-1992

Research Status or Completion Report

Agency: Province of Quebec

Date: November 28, 1991

Title: Satellite Aerial Navigation Aid

Key Words: Satelitte, Aerial Navigation, Navigation Aid

Current Year Resources:

Person Years: -

Funding: -

Timetable:

Starting Date: April 1991

Completion Date: 1993

Objective:

Work Done: Tests have been made with an EPS-800 unit, which serves as interface between GPS and pilot. Much refinement work to be done. More trials planned for 1992. Specific developments are anticipated.

Reports and Other Data Available: -

Project Leader: Service de la protection contre le feu

Year: 1991-1992

Research Status or Completion Report

Agency: Province of Quebec **Date:** November 28, 1991

Title: Engine Conversion of The CL-215 Airtankers

Key Words: Engine conversion, CL-215, Airtankers

Current Year Resources:

Person Years: - **Funding:** -

Timetable:

Starting Date: 1994 **Completion Date:** 2000

Objective: Modernize the CL-215's motors by replacing them by a newer engine, more powerful, reliable and cheaper to operate.

Work Done: Prototype CG-AWQ of the CL-215T made operational demonstration flights in real fire situations during the 1991 season. Comments were positive. Two CL-215T aircrafts will be part of Quebec's fleet for 1992 season.

Reports and Other Data Available: -

Project Leader: Service aérien gouvernemental **Year:** 1991-1992

rrf\f-status

ONTARIO

ONTARIO

Exchange of Information

Province of Ontario

1991

1. General Fire Situation

An analysis of drought codes in the Fall of 1990 and continuous monitoring of over winter snowfall during the winter of 1990/91 indicated a good potential for an earlier than normal start to the 1991 fire season.

The early start-up quickly became apparent on April 23 and 24 when fires were reported near the far northern communities of MacDowell Lake, Cat Lake and Deer Lake. This was the beginning of a very active fire season. Activity alternated between extensive protection areas in the Far North and intensive protection areas, throughout the season.

The middle of May saw activity centred in the eastern side of the province. Project fires occurred near Gogama and Chapleau. Gogama 4 ran to 4,400 ha and threatened a number of cottage sites. By the end of the month, activity was again developing in the North.

During the period June 4-15, all attention was directed north as fires were manned near the communities of Kingfisher, Big Trout Lake, Summer Beaver, Angling Lake, Sandy Lake and Deer Lake. All of these fires required personnel and many of them required tanker support for line holding or values protection. Residents were evacuated from Summer Beaver and Deer Lake. On June 10th, Red Lake fire number 23 started north of Deer Lake and spread south through town, stopping only when it reached the water.

As we approached the middle of June activity had spread to all parts of the Province with moderately sized fires occurring in such diverse locations as Big Trout Lake in the north and, Timmins, Wawa, Hearst and Chapleau in the east. During the period of June 23-28, 162 fires were actioned.

The activity in the North continued into the first week of July. July 13 began another active period with 314 fires reported within the next 9 days. Fire behaviour was very active with control problems reported. Fires were all kept small except Geraldton 40, a 400 ha excursion from a Prescribed Burn.

By the end of July, there had been 1,397 fires and 157,545 ha burned.

August was the most active month of the season. Only two days between August 7 and September 2 had less than 20 fires (Aug. 17 - 4 fires and Aug. 24 - 14 fires). Total fires for the period was 912, an average of almost 34 fires per day. Fire activity during the middle of the month was spread across the province from Red Lake to Pembroke. On August 12, a Provincial Fire Team was assigned to the north, to be based in Webequie and to develop strategies to deal with the fires there. Some residents were evacuated from there due to smoke. Extreme fire behaviour was reported on new and existing fires. On August 13, 24 fires occurred resulting in 2 project fires. Geraldton 92 spread to 1,100 ha in 5 hrs. 18,000 cords of cut wood and a Forest Industry camp were in the fire area. Hearst 22 spread to 180 ha in a cottage area. Other fires required heavy attack. The remainder of the Webequie residents were evacuated to Geraldton. August 14 brought 31 fires and severe burning conditions. Northern fires were active with smoke hampering operations. 40 firefighters were brought from B.C. to help with Geraldton 92 and 10 initial attack crews also arrived from B.C. Wawa 42 occurred, 150 ha in rough terrain, with water scarce and cut wood in the area. On August 15, 67 fires occurred. Sudbury 164 and 165 were ignited by lightning. Strong winds and severe weather (tornado nearby) forced air attack off the fires. These fires soon grew to 250 ha each. 20 B.C. firefighters, brought to help on Wawa 42 went to Sudbury. Some residents of Lansdowne House were evacuated to Geraldton due to smoke. On August 16, we started to make progress even though daily fire occurrence was still high. On August 21, personnel started to move home and by August 26, everything was back to normal.

On August 27, we were back into large numbers of fires. Haze caused detection problems. Fresh firefighters were hard to find. Over the next week, 336 fires were reported, severely taxing an already stretched and tired organization. Many fires required extended commitment due to dry conditions and deep and intense burning. On August 30, 4 fires arrived near White River. One grew to 65 ha while another grew to 35 ha. Control problems were cited on many fires and personnel from Saskatchewan and Alberta were brought in to help.

Finally, on September 3, things started to ease and the situation was brought under control. The Fall brought almost continuously wet weather and no further fire problems developed.

Fire Occurrence

Month	# Fires (1991)	# Fires Last 10 Year Average
March	12	17.4
April	210	236.7
May	231	305.0
June	415	331.2
July	586	514.0
August	944	457.4
September	138	132.2
October	11	28.7
November	12	7.0
December	1	.2
	2560	2029.8

Number of Fires and Hectares Burned by Cause by Region (1991)

	NW	NC	NO	NE	AL
Lightning	403	304	171	304	55
Hectares	185819.5	81010.1	39747.6	947.9	101.3
Recreation	63	68	38	123	94
Hectares	116.0	32.8	5388.8	58.1	37.8
Resident	47	13	29	36	57
Hectares	392.7	38.2	721.9	326.0	70.1
Miscellaneous	85	64	37	58	51
Hectares	169.9	409.8	1152.8	58.6	20.7
Railway	16	29	19	22	9
Hectares	35.4	45.8	385.2	43.0	2.4
Forest Industry	14	12	7	5	1
Hectares	2.3	193.1	6.7	1.9	.5
Other Industry	9	3	4	6	1
Hectares	773.7	6.2	54.0	1.0	.1
Incendiary	48	3	29	5	12
Hectares	290.2	41.1	57.5	.7	1.2
Unknown	6	1	4	5	13
Hectares	11.5	.1	1.0	2.0	4.3
TOTAL	691	497	338	564	293
HECTARES	187611.2	81777.2	47515.5	1439.2	248.4

Number of Fires and Hectares Burned by Cause by Region (1991) (Continued)

	EA	CE	SW	ONT	
Lightning	16	1	5	1259	(49.2%)
Hectares	116.5	.1	.5	307743.5	(96.5%)
Recreation	31	9	4	430	(16.8%)
Hectares	38.0	25.2	.4	5697.1	(1.8%)
Resident	28	13	10	233	(9.1%)
Hectares	12.0	5.0	7.4	1573.3	
Miscellaneous	20	4	6	325	(12.7%)
Hectares	4.7	.5	.6	1817.6	
Railway	5	1	-	101	(4.0%)
Hectares	1.9	2.5	-.-	516.2	
Forest Industry	-	1	-	40	(1.6%)
Hectares	-.-	.1	-.-	204.6	
Other Industry	1	-	1	25	(1.0%)
Hectares	.5	-.-	.1	835.6	
Incendiary	10	-	4	111	(4.3%)
Hectares	44.3	-.-	.8	445.8	
Unknown	3	3	1	36	(1.4%)
Hectares	30.1	.3	.1	49.4	
TOTAL	114	32	31	2560	
HECTARES	248.0	33.7	9.9	318883.1	

Fires - 200 Hectares and Greater (1991)

Region	# Fires	# Hectares
Northwestern	18	186027.0
North Central	16	80724.0
Northern	18	45445.0
Northeastern	2	429.0
Algonquin	-	-.-
Eastern	-	-.-
Central	-	-.-
Southwestern	-	-.-
TOTAL	**54**	**312625.0**

Summary of Action

Type of Action	# Fires	# Hectares
Completely actioned	14	45044.0
Limited action	9	159009.0
No action	33	108572.0
TOTAL	**54**	**312625.0**

Degree of Response Summary - 1991

Degree of Response	# Fires	% of Total Fires	# Hectares Burned	% of Total Hectares Burned
Response (Aggressive)				
(Less than 200 h.)	2390	93.4	4174.0	1.3
(200 h. & greater)	14	.6	45044.0	14.1
Response (Limited)				
(Less than 200 ha.)	38	1.5	747.4	.2
(200 ha. & greater)	9	.4	159009.0	49.9
Response (No action taken)				
(Less than 200 ha.)	78	3.1	1336.7	4.2
(200 ha. & greater)	31	1.2	108572.0	34.1
TOTAL	2560		318883.1	

2. Aircraft Utilization

An active fire season commenced in late April and did not subside until early September. August, normally a relatively quiet fire month, was one of the busiest on record. Fires occurred near settlements in the far north, resulting in evacuations. Due to the isolated location of many of these fires, a significant number of helicopter flying hours were incurred.

Ontario received Air Attack assistance from Saskatchewan, Manitoba, Alberta, Quebec, and the Northwest Territories. The Saskatchewan tanker group assisted on three separate occasions, while Northwest Territories tanker groups made six trips into Ontario.

Two birddogs and three CL-215s were deployed from Ontario to fires in Quebec in June. Quick strike missions into Manitoba and Minnesota were provided out of our Northwestern Region.

There were no aircraft accidents resulting in serious injuries during the 1991 fire season.

Aircraft Utilization Report

Fixed Wing

Aircraft Type	No.	Hours Bombing	Litres Dropped Foam/Water
CL-215	16	1374.5	20,234,380/28,900,990
Twin Otter	5	428.0	NIL Foam/ 5,901,835
Subtotal	**21**	**Hours: 1802.0**	**Litres Foam: 20,234,380/ Water: 34,802,825**
		TOTAL	**55,037,205**

Rotary Wing

Aircraft Type	No.	Hours Bombing	Litres Dropped Foam/Water
Bell 206	4	74.9	269,600/ 169,600
Bell 204	7	95.0	/ 913,746
Bell 205	12	224.9	/ 2,658,488
Subtotal	**23**	**Hours: 394.8**	**Litres: 269,600/ 3,741,834**

TOTAL HOURS FLOWN		**TOTAL LITRES**	
Fixed Wing	1802.0	Water	38,544,659
Rotary Wing	394.8	Foam	20,503,980
GRAND TOTAL	**2196.8**		**59,048,639**

3. Equipment Development and Testing

During the winter and spring of 1991, all of the OMNR's forest fire suppression equipment was converted from threaded to quick-connect attachments. Ontario is now compatible with most other agencies in Canada. During the 1991 fire season the following items were evaluated:

1. Lightweight Camping/Suppression Gear Project. As part of a project in the Northeastern Region the following items were evaluated:

   i) Personal Gear - 2 Part Pack (OMNR Design)
      - BOISE Field Pack (NFES #1372)
      - Various Air Mattresses
      - Various Thermarests
      - Various Lightweight Sleeping Bags
      - Boise Headlamps (NFES #0110 and #0713)
      - Compression Sacks

   ii) Tents - 1 Man Types
      - 3 Man Types
      - 4 Man Types
      - BOISE (NFES #0077)

   iii) Camping Stoves - 3 Man

   iv) Cookery Kits - 3 Man

   v) Hose - Synthetic 1 and 1 1/2"
      - Econoflo

   vi) Pumps - Mark 26
      - Mini Mark
      - Floto Pump
      - Gorman Rupp Backpack

   vii) Portable Tanks - Stilwell 60 gallon
      - Stilwell 110 gallon

A report is being prepared and should be available early in the new year.

2. Portable Hose Winder for 5/8 and 3/4 Inch Hose. Two winders were submitted to the OMNR in August for evaluation. These have not yet been fully evaluated. From limited use, the winder looks practical.

3. OMNR Designed Sleeping Bag. This new sleeping bag appears to be an excellent bag. It weighs 2 1/2 pounds and measures 36" by 84". The filling is Dacron Hollofil II, 4-hole fibre.

4. National Fire Equipment Limited Hose. Two lengths of hose were received in late August for evaluation. The OMNR will be doing some work on the hose at the PNFI this winter. The hose has been constructed in accordance with ULC Specification S519-M90, Standard for Percolating Forestry Hose.

5. Ground Foam. A variety of ground foam equipment has been evaluated over the last two fire seasons for suitability in Ontario. The evaluation has been completed in 1991. A kit incorporating suitable equipment is being developed to be recommended for implementation over the next three years.

4. Fire Prevention Activities

Although not specifically directed at prevention, the theme can be found throughout the 50 minute film entitled "Gone Forest Firefighting". Prevention program staff coordinated the development and release of the film which has already received an international award. Plans are to further the film's exposure and utility by developing educational packages for future interpretive and educational endeavours.

A comprehensive Wildland/Urban Interface program was initiated this year. Operational testing of an inspection form which details numerical ratings for over 20 site and structural hazards, was undertaken by a number of cooperators, including municipal fire departments, three states and an insurance company this summer. A three year development plan has been approved with the Great Lakes Fire Compact, and a number of different forms of presentation materials, display systems, education programs and guidebooks will be developed over the next year.

A new fire prevention materials catalogue was produced for field use in late 1991. All materials were revamped this year to meet new plain language guidelines as well as the requirements of the French Language Services Act. In addition, another 900 new highway signs and two billboards were produced for field use this year.

A final draft of new fire regulations will be submitted to policy committee early in the new year. Proposed changes to the regulations include; more stringent rules for campfires, the requirement for fire extinguishers on mechanical equipment and regulations governing the use of ATV's in forested areas. A major communication and marketing effort will be required, as well as cooperation by the forest industry, in the production of new suppression equipment and training guidelines.

Brooks Marketing Resources Inc. was awarded a three year contract to supply media and creative services and support the production and delivery of marketing plans for Ontario's prevention program.

Nearly one million dollars was allocated to enhance the field-delivery of the fire prevention program in the province. A business case was developed showing that providing and supporting a dedicated prevention person in each district could result in a minimum 1.5 million dollar saving. Efforts are underway to further quantify and support this exciting new opportunity.

5. Training

Ten Ontario fire staff attended the "Fire Operations in the Urban Interface" course (S-205) delivered by USFS, held in Tree Haven, Wisconsin, January/91. The course is designed for initial attack incident commanders and municipal fire department personnel who are confronted with wildland fires that threaten life, property and improvements. The following subject areas were presented: Size-up; Initial Strategy and Action Plan; Structure Triage; Tactics; Action Plan Assessment; Public Relations and Follow-up; Safety.

In February/91, a Municipal Agreements Seminar was conducted for fire staff involved in negotiating fire suppression agreements with municipalities. Topics covered in the seminar included communications, needs analysis, negotiating skills, legal considerations, marketing and municipal perspectives.

Two Fire Behaviour Officer (FBO) Workshops were held in July/91. The first workshop familiarized experienced FBO's with the Fire Behaviour Prediction (FBP) computer program now available for laptop computers. The purpose of the second workshop was to train new FBO's.

In addition to the FBO training, several MNR fire staff attended a Fire Behaviour Prediction System Technology Transfer and Training Seminar, December/91, conducted by Forestry Canada.

Background and an understanding of the FBP system were presented and some hands-on exercises with the computer program were provided.

In May/91, a three-person instructor cadre from USFS, Region 1, delivered a seminar on "Escaped Fire Situation Analysis" (EFSA). EFSA is a decision analysis process from which a plan of action to suppress, contain or confine an escaped wildfire is developed (the appropriate suppression response for the particular situation). Later in the summer, a fire staff person was assigned to the U.S. fire team in a trainee position to observe EFSA in action.

Updates to the S-100 Firefighter Training Manual have been identified and will be incorporated into the new reformatted version which will be available for spring/92 training.

Job performance requirements for the Crew Boss position are currently being developed and the S-200 Crew Boss Training Manual will be revised accordingly.

An S-300 Initial Attack Fire Boss course was conducted in April/May of 91. This course undergoes an annual review/update.

The S-102 Forest Industry Firefighter course and the S-301 Forest Industry Initial Attack Fire Boss Course are both being reviewed for possible updates and revision to reflect changes in the forest industry (e.g. modified harvesting operations).

6. Prescribed Burning

A total of 28 prescribed burns were ignited in 1991. The area treated totalled 8567.0 hectares. The program had called for 42 burns to treat an area of 10,250.9 hectares. The primary reason for this years shortfall was the busier than normal fire season and drought conditions which existed throughout the summer.

As with previous years, the main prescribed burn client remains forest management. This year, 24 burns were conducted for silvicultural purposes. Of the remaining four burns, two were conducted for fire research purposes, while the other two where conducted for wildlife habitat (deer range habitat improvement).

The fire research burns, ignited in the Blind River and Pembroke Districts, were a joint OMNR/Forestry Canada project. The Blind River burn was a continuation of the burning program in immature Jackpine. The Pembroke burn program, first initiated in 1991, was conducted in a semi-mature jackpine/red and white pine mixed forest. Various silvicultural and prescribed burn relationships/applications are being studied.

Both deer range habitat improvement burns were very successful and as such, it is expected the program will expand next year. These were the first such burns since 1987.

Although the planned vegetation management burns in southwestern Ontario did not occur, interest in managing ecosystems through prescribed fire is increasing. These additional clients are planning to use prescribed fire in the next 1-2 years in their respective areas.

1991 Prescribed Burning

District	Burns	Hectares
Silvicultural Burns		
Geraldton	2	370.0
Nipigon	2	675.0
Thunder Bay	1	500.0
Gogama	2	457.0
Hearst	2	2225.0
Chapleau	1	600.0
Cochrane	1	912.0
Kapuskasing	1	850.0
Kirkland Lake	1	205.0
Timmins	1	198.0
Blind River	2	180.0
Wawa	2	400.0
North Bay	1	332.0
Bancroft	3	131.0
Algonquin Park	1	58.0
Minden	1	42.0
Sub-total	**24**	**8135.0**
Wildlife Habitat		
Dryden	1	24.0
North Bay	1	400.0
Sub-total	**2**	**424.0**
Federal Research		
Blind River	1	5.9
Pembroke	1	2.1
Sub-total	**2**	**8.0**
TOTAL	**28**	**8567.0**

7. Publications, Films and Videotapes

AFFMB. 1991. 1990 Fall Drought Situation and Winter Weather Situation Report for Ontario. Ontario Ministry of Natural Resources, Aviation, Flood and Fire Management Branch, Publication #285.

AFFMB. 1991. 1991 OMNR Fire Weather System Review. Ontario Ministry of Natural Resources, Aviation, Flood and Fire Management Branch, Publication #287.

AFFMB. 1991. Winter Weather Situation Report (March). Ontario Ministry of Natural Resources, Aviation, Flood and Fire Management Branch, Publication #289.

AFFMB. 1991. 1990/91 Winter Weather Summary and Spring Forecast. Ontario Ministry of Natural Resources, Aviation, Flood and Fire Management Branch, Publication #290.

AFFMB. 1991. Exchange of Information, Province of Ontario, 1990. Ontario Ministry of Natural Resources, Aviation, Flood and Fire Management Branch, Publication #291.

AFFMB. 1991. Beware and Prepare. Media kit (video, book, brochures) Ontario version. English/French.

AFFMB. 1991. Statements of Strategic Directions - Aviation, Flood and Fire Management program.

Brosemer, K.A. & J. Caputo. 1991. Use of Landsat MSS Roster-based Data in a PC-Arc/Info Geographic Information System for Fire Management. Ontario Ministry of Natural Resources, Aviation, Flood and Fire Management Branch, Publication #294.

MacQuarrie, M. and M.L. Willick. 1991. Board of Review - Prescribed Burn Escapes. Ontario Ministry of Natural Resources, Aviation, Flood and Fire Management Branch, Publication #293.

Orton, M. 1991. 1990 Fire Report Statistics. Ontario Ministry of Natural Resources, Aviation, Flood and Fire Management Branch, Publication #286.

Tithecott, A.G. 1991. The Analysis of Annual Trends and Damages in People-Caused Forest Fire Occurrence Rates. OMNR. AFFMB - Discussion Paper for Provincial Prevention Committee.

Tithecott, A.G. 1991. Analysis of Lightning Fire Arrival Holdover Conditions in Ontario. OMNR, Aviation, Flood and Fire Management Branch.

Ward, P.C. and P.A. McBay. 1991. 1991/92 Program of the Research and Development Section, AFFMB. Ontario Ministry of Natural Resources, Aviation, Flood and Fire Management Branch, Publication #292.

Videotapes

AFFMB. 1991. Basic Forest Fire Suppression Training Program for Municipal Fire Departments. Set of 10 videotapes, 10 workbooks, Glossary of Terms and a Course Administrator's Guide. Produced in both French and English.

AFFMB. 1991. Gone Forest Firefighting. 16 MM film, VHS video. English/French. 48 Min.

8. Organizational Changes

To date there have been 2 senior fire management staff changes during 1991. Trevor Woods has replaced Mike Willick as the Manager for Fire Management and Bruce Little (acting) has replaced Tom Campbell as the Provincial Operations Supervisor. The Ministry Of Natural Resources in currently being restructured and there will be organizational changes within the Fire Management Program at the Main Office and Regional levels. An updated organization chart will be provided to member agencies when these are finalized.

9. Research and Development Projects

The Research and Development Section of the Aviation, Flood and Fire Management Branch provides a number of services to the fire organization, including a research coordination program, a technology evaluation and transfer program, and management of the fire library.

Research Coordination Program

The Research Coordination program has three components: providing support and coordination to fire research activities in Ontario, identifying and communicating research needs, and coordinating the evaluation and transfer of research results.

These activities took place in the program during 1991:

1. Fire Management Information System Project

The fire program is planning to develop and implement a comprehensive computer based information system, to replace the existing "Decision Support System" which has been operating since 1987. A feasibility study was undertaken in the April-December period to determine the required scope of the new FMIS, and to develop an implementation plan.

A five-year program has been developed to implement an integrated system to provide operational decision support systems, management information systems, and logistics management systems. The first system components are scheduled to come on-line in April 1993.

2. Experimental Burning - Point Source Ignition Fires

Since 1984 the fire research unit at the Great Lakes Forestry Centre in cooperation with the Ontario fire program has been conducting a project to investigate the behaviour and acceleration rates of point-source ignition fires in immature jack pine. Four additional fires were conducted this year, under extreme fire weather conditions, essentially completing the field work in this study. In 1991 a subsidiary study was also initiated to gather observations of initiating fire behaviour from fire crew leaders taking action on wildfires.

3. Behaviour and Impacts of Large-scale Prescribed Fire

Airborne and ground-based instrumentation were used to intensively study an operational prescribed fire in Lincoln Township, Chapleau District as part of the joint Forestry Canada/US Forest Service study of the behaviour and environmental impacts of large-scale, mass-ignition burns. Participants included Forestry Canada, USFS, the University of Iowa and AES.

4. University of Toronto Research Contract

Continuing support was provided to the fire research program of Dr. D.L. Martell at the University of Toronto. Work in 1991 was concentrated on the field implementation and evaluation of an airtanker deployment model. This is described further under the Technology Evaluation Program section, to follow.

5. Frontier Lake Experimental Burning Project

Staff in the Fire Ecology and Behaviour Project at PNFI have established an experimental burning project at Frontier Lake on CFB Petawawa, adjoining the Forestry Institute. The area consists of plots of standing jack pine and jack pine slash.

Line fires are ignited to study effects of BUI on rate of spread. Pre and post burn vegetation composition and nutrient status are being monitored. Comparisons of fire to mechanical site preparation are also being made. Funding and logistical support is being provided by the Ontario fire program and two of the Regional Technology Development Units of the Ontario forest management program. Ten plots were burned in 1991; further work is planned for 1992.

6. Crew Productivity Study

Work had been initiated on a study of crew productivity rates with Ed Stechishen's project at PNFI. That project group was terminated in March 1991. Subsequently, discussions have been held with Kelvin Hirsch of the Northern Forestry Centre concerning a larger study of suppression resource productivity to involve several provincial/territorial agencies.

7. Study of fine fuel moisture content

Rob McAlpine at PNFI has initiated a field study of diurnal trends in fine fuel moisture content. Funding was provided by the R&D Section through a collaborative research agreement to acquire balances and other equipment required for this project.

8. Cooperative Projects with Technology Development Units

Four Technology Development Units have been established in Ontario primarily to develop and transfer new technologies for forest management. The R&D Section of the fire program has been working cooperatively with the TDUs in a number of areas. Most recently, Charlie van Wagner, now retired as a Research Scientist from Forestry Canada, has been hired by the Central Ontario TDU to undertake a review of prescribed fire applications in central and southern Ontario vegetation types.

9. Temagami Fire Ecology Study

OMNR is developing a comprehensive resource planning process in the Temagami district of northeastern Ontario. In early 1991 an ecologist was hired to examine the historic, current and future role of fire in managing the forests of Temagami. The R&D Section has been working cooperatively with the fire ecologist to develop the fire ecology study. Most recently we provided software and assistance to create a forest fuel type map of the District.

Technology Evaluation and Transfer Program

The Technology Program is dedicated to the evaluation and transfer of new technologies required by the fire management program. Activities during 1991:

10. Ground Foam Evaluation

A variety of ground foam equipment has been evaluated over the last two fire seasons for suitability in Ontario. The evaluation has been completed in 1991. A kit incorporating suitable equipment is being developed to be recommended for implementation over the next three years.

11. People-caused Fire Occurrence

Cooperative work with Dr. D.L. Martell continues to improve people-caused fire arrival prediction models that have been implemented across the province.

Prediction models have also been used to analyze trends in people-caused fire occurrence. Discussion of trend analysis approaches is underway, particularly directed at assisting the prevention program in measuring program effectiveness.

12. Daily Airtanker Deployment Modelling

OMNR and Dr. D.L. Martell are continuing to develop a model to assist with daily deployment of airtankers. A prototype was evaluated in the Northwestern Region in 1991 and a new model is under development for evaluation in 1992.

13. Detection Planning and Analysis

Detection system analysis by D.L. Martell in the 1980's is being used to report annual detection system performance measures. The Detection Demand Index will also be evaluated in 1992 as a daily planning aid for detection managers.

14. Lightning Fire Occurrence/Arrival

A project is underway to examine a number of aspects of the lightning fire occurrence/arrival problem. Holdover and arrival processes have been studied and work will continue in lightning fire occurrence prediction, storm classification, and lightning activity forecasting.

15. Geographic Information System Use in Fire

As part of an ongoing project to develop GIS tools, conversion routines have been developed to convert Forest Resource Inventory data to forest fuel types. Data has been converted in both the Timmins and Temagami districts.

A GIS was used for mapping support on a project fire for the first time in Ontario on the 1991 GOGAMA 4 fire. The Timmins GIS office provided the expertise to map fire fuels, fire perimeter and values to protect. Post-fire GIS analysis included area and timber volume loss calculations.

Other tools have been or are being developed in Timmins include a prescribed burn planning system and a fire intelligence map for initial attack decisions.

16. Global Positioning Systems (GPS) and Loran

A project to study the use of GPS and Loran technology to acquire a variety of digital fire-related data for GIS import and analysis began in 1991 in the Timmins district. Perimeter data for several fires was acquired and imported into an Arc/Info GIS. The project will continue in 1992 using portable GPS units and Loran via a RS-232 interface now installed on all MNR aircraft.

17. Vegetation Management for Hazard Reduction

A Laurentian University proposal to develop vegetation management techniques to reduce fuel hazards in fire-prone or high-value areas is under review. Funding is available for a three year study that will include both field and lab studies.

Research Status or Completion Report

AGENCY: OMNR - AFFMB DATE: January 1991

TITLE: Fire Management Information System Project

KEY WORDS: information systems, decision support systems

CURRENT YEAR RESOURCES:

PERSON YEARS: FUNDING: $20,000

TIMETABLE:

STARTING DATE: 1991 COMPLETION DATE: 1996

OBJECTIVE: To develop and implement a comprehensive computer based information system for the Ontario fire management program.

WORK DONE: Project feasibility study completed. Design and development phase now underway.

REPORTS AND OTHER DATA AVAILABLE:

PROJECT LEADER: P.C. Ward YEAR: 1991

Research Status or Completion Report

AGENCY: OMNR - AFFMB DATE: January 1992

TITLE: Behaviour of Point-Source Ignition Fires, Immature Jack Pine

KEY WORDS: fire behaviour, point source ignition, jack pine, experimental burning

CURRENT YEAR RESOURCES:

PERSON YEARS: FUNDING: $16,000

TIMETABLE:

STARTING DATE: 1984 COMPLETION DATE: 1991

OBJECTIVE: To assist Forestry Canada in an experimental burning program of point-source ignition fires in immature pine.

WORK DONE: Twenty-two fires to date. Burning in the fuel type basically completed.

REPORTS AND OTHER DATA AVAILABLE: Results have been incorporated in the 1990 version of the Canadian Forest Fire Behaviour Prediction System.

PROJECT LEADER: P.C. Ward, OMNR & B.J. Stocks, Forestry Canada
YEAR: 1992

Research Status or Completion Report

AGENCY: OMNR - AFFMB DATE: January 1992

TITLE: Behaviour and Impacts of Large-scale Prescribed Fire

KEY WORDS: fire behaviour, environmental impact, prescribed fire

CURRENT YEAR RESOURCES:

PERSON YEARS: FUNDING: $15,000

TIMETABLE:

STARTING DATE: 1987 COMPLETION DATE: 1992

OBJECTIVE: To assist in the cooperative Canada/U.S. study of the behaviour and environmental impact of large-scale, mass-ignition prescribed fire.

WORK DONE: Beginning in 1987, ten operational PB's have been intensively studied using ground, tower and airborne instrumentation.

REPORTS AND OTHER DATA AVAILABLE: A large number of research papers have resulted from this project. See particularly the 1991 11th Conference on Fire and Forest Meteorology, Missoula, MT.

PROJECT LEADER: P.C. Ward, OMNR & B.J. Stocks, Forestry Canada
YEAR: 1992

Research Status or Completion Report

AGENCY: OMNR - AFFMB DATE: January 1992

TITLE: Development of Forest Fire Management Decision Support Systems

KEY WORDS: decision support systems, fire occurrence prediction, resource deployment

CURRENT YEAR RESOURCES:

PERSON YEARS: ______ FUNDING: $10,000

TIMETABLE:

STARTING DATE: 1989 COMPLETION DATE: under review

OBJECTIVE: To undertake cooperative research work with Dr. D.L. Martell on the development of decision support systems.

WORK DONE: Field evaluation of a regional Airtanker Deployment Model was begun in 1991.

REPORTS AND OTHER DATA AVAILABLE: ______

PROJECT LEADER: P.C. Ward, OMNR & D.L. Martell - U. of T.
YEAR: 1992

Research Status or Completion Report

AGENCY: OMNR - AFFMB DATE: January 1992

TITLE: Cooperative projects, Fire Behaviour and Ecology Project, PNFI

KEY WORDS:

CURRENT YEAR RESOURCES:

PERSON YEARS: FUNDING: $5,000

TIMETABLE:

STARTING DATE: 1991 COMPLETION DATE: 1993

OBJECTIVE: To provide collaborative support to research studies undertaken by the Fire Behaviour and Ecology Project at PNFI.

WORK DONE: Experimental burning and fire ecology study at Frontier Lake initiated 2) Diurnal fine fuel moisture study begun.

REPORTS AND OTHER DATA AVAILABLE:

PROJECT LEADER: P.C. Ward YEAR: 1992

Research Status or Completion Report

AGENCY: OMNR - AFFMB DATE: January 1992

TITLE: Ground Foam Systems Evaluation

KEY WORDS: foam, suppression

CURRENT YEAR RESOURCES:

PERSON YEARS: 0.3 FUNDING: $5,000

TIMETABLE:

STARTING DATE: 1989 COMPLETION DATE: 1991

OBJECTIVE: To identify appropriate applications, techniques and delivery systems for the ground application of firefighting foams.

WORK DONE: Ground-based foam application systems workshop held at PNFI in fall, 1989. Foam equipment distributed for evaluation in 1990 and 1991. Major portion of evaluation completed. An implementation plan is being developed.

REPORTS AND OTHER DATA AVAILABLE:

PROJECT LEADER: P.A. McBay YEAR: 1992

Research Status or Completion Report

AGENCY: OMNR - AFFMB DATE: January 1992

TITLE: Geographic Information System Study

KEY WORDS:

CURRENT YEAR RESOURCES:

PERSON YEARS: 0.3 FUNDING: $3,000

TIMETABLE:

STARTING DATE: March 1988 COMPLETION DATE: Ongoing

OBJECTIVE: Acquire the technical and management expertise required to prepare the fire management program for integration of GIS in all OMNR programs.

WORK DONE: A variety of related GIS tools have been developed in Sault Ste. Marie, Timmins and Temagami. Project will focus on the development of suitable GIS applications in those areas in Ontario where GIS technology and data is available.

REPORTS AND OTHER DATA AVAILABLE: Brosemer, K.M. and P.A. McBay 1989. The Integration of Geographic Information Systems Technology into the Fire Management Program.

PROJECT LEADER: P.A. McBay YEAR: 1992

Research Status or Completion Report

AGENCY: OMNR - AFFMB DATE: January 1992

TITLE: Vegetation Management Study

KEY WORDS: vegetation management, hazard-reduction

CURRENT YEAR RESOURCES:

PERSON YEARS: FUNDING: $5,000

TIMETABLE:

STARTING DATE: 1990 COMPLETION DATE: 1994

OBJECTIVE: Investigate the use of ground cover vegetation to reduce hazard in high value or high risk locations.

WORK DONE: A 3 year university study is being pursued.

REPORTS AND OTHER DATA AVAILABLE: Brosemer, K.M. 1990 Vegetation Management of Fire Hazard in High Risk or High Value Areas.

PROJECT LEADER: P.A. McBay YEAR: 1992

Research Status or Completion Report

AGENCY: OMNR - AFFMB **DATE:** January 1992

TITLE: Global Positioning System (GPS) and Loran

KEY WORDS: GPS, Loran, Geographic Information System

CURRENT YEAR RESOURCES:

PERSON YEARS: **FUNDING:** $5,000

TIMETABLE:

STARTING DATE: 1991 **COMPLETION DATE:** 1993

OBJECTIVE: To demonstrate the utility of GPS and Loran technology for acquisition of positioned data for GIS analysis and operational fire applications.

WORK DONE: Perimeter data acquired for several wildfires and imported to an Arc/INFO system.

REPORTS AND OTHER DATA AVAILABLE: L. Hill and E. Sense 1991. Computerized Geo-Referencing in Aerial Wildlife Surveys using Airborne Navigation Systems. Ontario Centre for Remote Sensing.

PROJECT LEADER: P.A. McBay **YEAR:** 1992

Research Status or Completion Report

AGENCY: OMNR - AFFMB **DATE:** January 1992

TITLE: Fire Occurrence Prediction

KEY WORDS: occurrence prediction, decision support system

CURRENT YEAR RESOURCES:

PERSON YEARS: 0.4 **FUNDING:** $3,000

TIMETABLE:

STARTING DATE: July 1988 **COMPLETION DATE:** 1993

OBJECTIVE: 1) Evaluate existing FOP systems and approaches. 2) Establish a framework for FOP for Ontario & identify research needs.

WORK DONE: Evaluations completed for people-caused occurrences for prediction systems. Focus now turned to lightning fire analysis.

REPORTS AND OTHER DATA AVAILABLE: See Tithecott, A.G. 1990A, 1990B, 1990C in 1990 Exchange of Information Report

PROJECT LEADER: A.G. Tithecott **YEAR:** 1992

Research Status or Completion Report

AGENCY: OMNR - AFFMB **DATE:** January 1992

TITLE: Airtanker Deployment Model

KEY WORDS:

CURRENT YEAR RESOURCES:

PERSON YEARS: 0.4 **FUNDING:** $8,000

TIMETABLE:

STARTING DATE: 1990 **COMPLETION DATE:** 1993

OBJECTIVE: To develop a daily airtanker deployment model for use in Regional and provincial Fire Centres. To improve deployment and identification of when outside resources are required.

WORK DONE: Developing new prototype.

REPORTS AND OTHER DATA AVAILABLE: Internal progress report followed evaluation of 1991.

PROJECT LEADER: A.G. Tithecott - OMNR, D.L. Martell - U. of T.
YEAR: 1992

Research Status or Completion Report

AGENCY: OMNR - AFFMB **DATE:** January 1992

TITLE: Lightning Analysis

KEY WORDS:

CURRENT YEAR RESOURCES:

PERSON YEARS: **FUNDING:**

TIMETABLE:

STARTING DATE: 1990 **COMPLETION DATE:** 1992

OBJECTIVE: To aid PNFI project PI-4 to analyze lightning storm and fire occurrence characteristics.

WORK DONE: Lightning, precipitation radar, hourly weather and fire occurrence data has been collected. Analysis to begin early in 1991 at PNFI.

REPORTS AND OTHER DATA AVAILABLE:

PROJECT LEADER: A.G. Tithecott - OMNR & M.D. Flannigan - PNFI
YEAR: 1992

Research Status or Completion Report

AGENCY: OMNR - AFFMB DATE: January 1992

TITLE: Detection System Planning and Analysis

KEY WORDS: detection, decision support systems analysis

CURRENT YEAR RESOURCES:

PERSON YEARS: 0.1 FUNDING: -

TIMETABLE:

STARTING DATE: Aug. 1991 COMPLETION DATE: Nov. 1992

OBJECTIVE: 1) Provide tools for improved analysis of detection program. 2) Provide tools to assist daily detection planning.

WORK DONE: Work by D.L. Martell has been transferred to analysis and planning tools for field evaluation in 1992.

REPORTS AND OTHER DATA AVAILABLE:

PROJECT LEADER: A.G. Tithecott YEAR: 1992

Research, Development and Technology Transfer Needs

AGENCY: OMNR - AFFMB **DATE:** January 1992

TITLE OF AREA OF NEED: Fire Management Production Functions

PRIORITY: (Check One)

High ☐ Medium ☐ Low ☐

BACKGROUND: Knowledge of the productivity of airtankers and suppression crews under different fire conditions is important when making resource deployment and dispatch decisions. The value of new suppression techniques or technologies (eg. foam) must be measured in part through the impact on suppression resource productivity.

PROPOSAL OR RECOMMENDATION: There is a need for a significant research effort to: 1) quantify productivity of existing resources under various fire behaviour conditions. 2) determine the productivity impacts of new suppression methods. 3) develop models for managers to use in making resource deployment and dispatch decisions.

A preliminary study of ground crew productivity was initiated with E. Stechisen at PNFI, prior to termination of that PNFI project. New discussions taking place with Kelvin Kirsch from the Northern Forestry Centre in Edmonton.

Research, Development and Technology Transfer Needs

AGENCY: OMNR - AFFMB **DATE:** January 1992

TITLE OF AREA OF NEED: Social and Economic Impacts of Forest Fire

PRIORITY: (Check One)

High ☐ **Medium** ☐ **Low** ☐

BACKGROUND: A better understanding is required of the social and economic impacts of community disruption and resource losses covered by fire, and the impact of urbanizing trends in forested areas. The true economic and social impact of severe fire seasons (eg. Manitoba 1989) at present cannot be realistically quantified.

PROPOSAL OR RECOMMENDATION: A long-term study integrating measurement of the biological, economic and social impact of fire is needed to provide fire management agencies with a more rational basis for their programs.

Research, Development and Technology Transfer Needs

AGENCY: OMNR - AFFMB **DATE:** January 1992

TITLE OF AREA OF NEED: Basic research in the physics and chemistry of fire

PRIORITY: (Check One)

High ☐ Medium ☐ Low ☐

BACKGROUND: Knowledge of fundamental fire processes is the backbone of most applied fire research. Declining fire research staffing levels and demands for short-term research results mitigate against such basic research programs. Empirical knowledge of basic fire processes is still a necessity.

PROPOSAL OR RECOMMENDATION: Operational agencies must be prepared to support basic research programs in fire physics and chemistry, even if there are not immediate operational benefits to such work.

MANITOBA

PROVINCE OF MANITOBA
EXCHANGE OF INFORMATION 1991

1. GENERAL FIRE SITUATION

A. Overview

Manitoba experienced an average fire year in 1991. In total, 675 fires (389 lightning and 286 human) burned an estimated 150,900 hectares at a total cost of $19.4 million. Although precipitation was close to normal in most areas, a very dry spring and month of August, combined with several preceding years of below normal precipitation resulted in a significant percentage of days being at higher alert levels (levels 2, 3, & 4). While the number of fires was slightly above the twenty fire year average of 597, losses were below the 25 year average of 258,000 hectares burned. Over 70% of all losses in 1991 occurred in the lower priority areas. There were no project fire teams dispatched in 1991.

The first fires of the season were reported in early April and by the end of the month 129 fires had burned over 23,000 hectares. An additional 75 fires in May burned another 61,900 hectares. June and July were relatively quiet, while the month of August posed the most serious problems of the year when 222 fires were reported. Problem fires in August resulted in evacuations at Lac Brochet and Red Sucker Lake. The Hooker Lake fire in the Abitibi pulp berth burned 600 hectares and the Moss Spur fire burned a peat moss plant with property losses estimated at $½ million.

Expenditures in 1991 will approximate $19.4 million, slightly below the 10 year average of $21.9 million (in 1991 dollars).

During the year, a CL-215 group was brought into Manitoba twice from the N.W.T., while quick strike arrangements were made with both Saskatchewan and Ontario. Manitoba also provided a CL-215 group to the N.W.T.

B. Statistical Comparisons

Year	# of Fires	Hectares Burned	Program Costs (millions $)
1991	675	150,900	$19.4
1990	570	16,400	20.5
1989	1,226	3,568,000	63.2
1988	982	485,600	24.2
1987	519	169,500	15.1
1986	217	10,300	7.9
25 Year Average	597	258,500	21.9 (10 year average in 91$)

2. AIRCRAFT UTILIZATION

In 1991, Fire Program contracted five CL-215 Waterbombers and two Otter aircraft from the Manitoba Government Air Division. In addition, two 205 helicopters, two 204 helicopters and one 206 helicopter were contracted. Casual charter of helicopters and fixed wing aircraft supplemented this base fleet whenever needed during peak fire periods. Waterbomber assistance was also provided by the N.W.T. on two occasions this season.

Total hours flown during the 1991 fire season were 792.1 on waterbombers, 2,768.0 on other fixed wing aircraft and 4,433.1 on helicopters. There were no major aircraft accidents reported this year. Total hours flown are detailed on the attached form.

In its second year of operation the Bird Dog Program conducted evaluations of several aircraft to determine which type would be most suitable for this operation. It was found that the 310 Cessna airplane was the most suitable aircraft for our operation.

Experiments were conducted during the summer at Dauphin using crop spraying aircraft as waterbombers to determine the drop pattern and suitability using foam and water drops. A preliminary video was produced on this operation, and it was generally concluded that during the early fire season these aircraft could be utilized effectively on grassland fires.

Manitoba field tested the Global Positioning System and will be installing this equipment in most contract aircraft during 1992.

3. EQUIPMENT DEVELOPMENT AND TESTING

1. The Intelligent Fire Management Information System (IFMIS) was field tested during the season in the Eastern Region Fire Centre and was used daily in the Provincial Fire Centre as a tool for the deployment of resources.

2. Manitoba continued to use foam as a suppression tool. Two compressed air units are operational in the Whiteshell Park and initial attack crews in several regions were trained in the ground application of foam. Chemonics Industries was the successful bidder on foam needs for 1991 and installed bulk tanks at airports at The Pas, Thompson and Gimli, the primary attack bases for the CL215's. These tanks were purchased at the end of the fire season by Manitoba.

3. Manitoba developed its own helitorch during 1991 and made six units, which are assigned to three burn teams.

4. Work continued on the operational use of a terrigator crop sprayer to be used on flash fuels and peat fires. A local supplier has installed a Mark 3 pump head on his unit to provide pressure. His supplier is now looking at the installation of a hydraulic pump on this unit for 1992 - to replace the Mark 3.

5. In conjunction with staff of the provincial Fire Commissioner's Office, field testing of a large volume pumping system for water delivery using 4" and 2½" hose lines was carried out on a fire near Grand Rapids. This installation was successful in supplying the water needs on this fire and thus eliminated the need for aerial delivery to the fireline. The pump unit used is the same pump that is being promoted by Helitactics Limited of Newfoundland. Over the winter of 1992 a video will be developed showing the use of this pump and its application for delivery of water to sprinkler systems for community protection on interface fires.

4. FIRE PREVENTION ACTIVITIES

Manitoba continued to use the media for promotion of fire prevention awareness to the general public - earmarking its advertisements to the long weekends and the spring burning season using material developed for the specific need.

In conjunction with the Manitoba Wildlife Federation and Wildlife Branch the 1-800-782-0076 Turn In Poachers number is now used to report forest fires. This telephone number is answered by staff paid for by the partners. Complaints and reports are referred directly to the region duty officers for action.

A concentrated approach is being pursued along the agro-forest fringe and interface areas to decrease the incidence of wildfires. Seasonal fire prevention patrolpersons meet with farmers, cottage owner associations, schools, service clubs and youth groups to promote fire prevention.

Peat burning guidelines have been developed and are being used to decrease the problem caused by peat smoke during the fall. "Orders to extinguish" are issued by a Director of the Environment Department whenever smoke poses a potential problem.

The Whiteshell and Southeast regions worked closely with both major railways in conducting hazard reduction burns along their right-of-ways in the spring. This resulted in a marked decrease in losses due to railway caused fires.

5. TRAINING

The laser disc Fire Behaviour training package acquired from Alberta is being used in the Eastern Region on a trial basis.

Development of a Fire Clerical Manual continues with completion scheduled in advance of the 1992 fire season.

Training and certification of Emergency Firefighters continued with the addition of a computerized record system for inventory of fire activity used to determine the currency and need for retraining.

6. PRESCRIBED BURNING

No prescribed burns were carried out during 1991, but numerous hazard reduction burns, targeting marshlands, meadows and road allowances throughout the forest fringe were successfully completed.

7. PUBLICATIONS, FILMS AND VIDEO TAPES

There were no new publications, films or videos developed during 1991.

8. ORGANIZATION CHARTS - CHANGES

There were modest reductions in the number of seasonal initial attack crewmembers, and their length of employment. The Fire Program lost the services of R. J. Postnikoff to Forestry Branch at Beausejour as a result of restructuring. J. Nixdorf was permanently transferred to headquarters as an intelligence officer during the fire season and for clerical and equipment acquisition support during the off season. D. Bon returned on a 40 week contract as the other intelligence officer. T. Gauthier, also on a 40 week term, fills the air attack co-ordinator role. The Department is now in the process of a re-organization at the management and regional level with completion scheduled for April 1, 1992. The present organization chart is enclosed.

Glenn Peterson was assigned by Forestry Branch to provide liaison between fire and forestry and to assist the Fire Section with fire/forestry problems and the implementation of IFMIS.

9. EDUCATION REPORT AND PARTICIPATION

No activity in this function.

10. OTHER ITEMS

Refinements continued on the Alert Response System, which was developed after the 1989 fire season. These revisions included the addition of more alert levels, the creation of two geographic zones, 3 distinct seasons and the reduction of attack times in lower priority areas, along with the provision of more realistic resource levels.

With the two intelligence officers, refinements were made in the operation of the Provincial Fire Centre particularly in aircraft and financial commitments.

The Department is currently in the process of completing a computerized inventory system to start April 1, 1992.

In a co-management agreement with the Mathias Colomb Band at Pukatawagan, initial attack response in a designated area was assigned to the band.

11. RESEARCH AND DEVELOPMENT PROJECTS (Refer to attached forms)

A. Needs

1. Economics of fire operations.
2. Fire Management data systems.
3. Fire suppression productivity and effectiveness.

B. Status Reports

No formal programs/projects were completed in 1991.

AIRCRAFT UTILIZATION REPORT

1. FIXED WING

Aircraft Type	No.	Hours Bombing		Litres Dropped Ret./ Foam / Water
CL-215	5	738.9	Contract	2,300,400
CL-215	2	53.2	Casual	167,400
Other		2,768.0		

Subtotal	Hours: 3,559.2	Litres	
			Foam
			Long-Term
			Short-Term
		Total	2,467,800

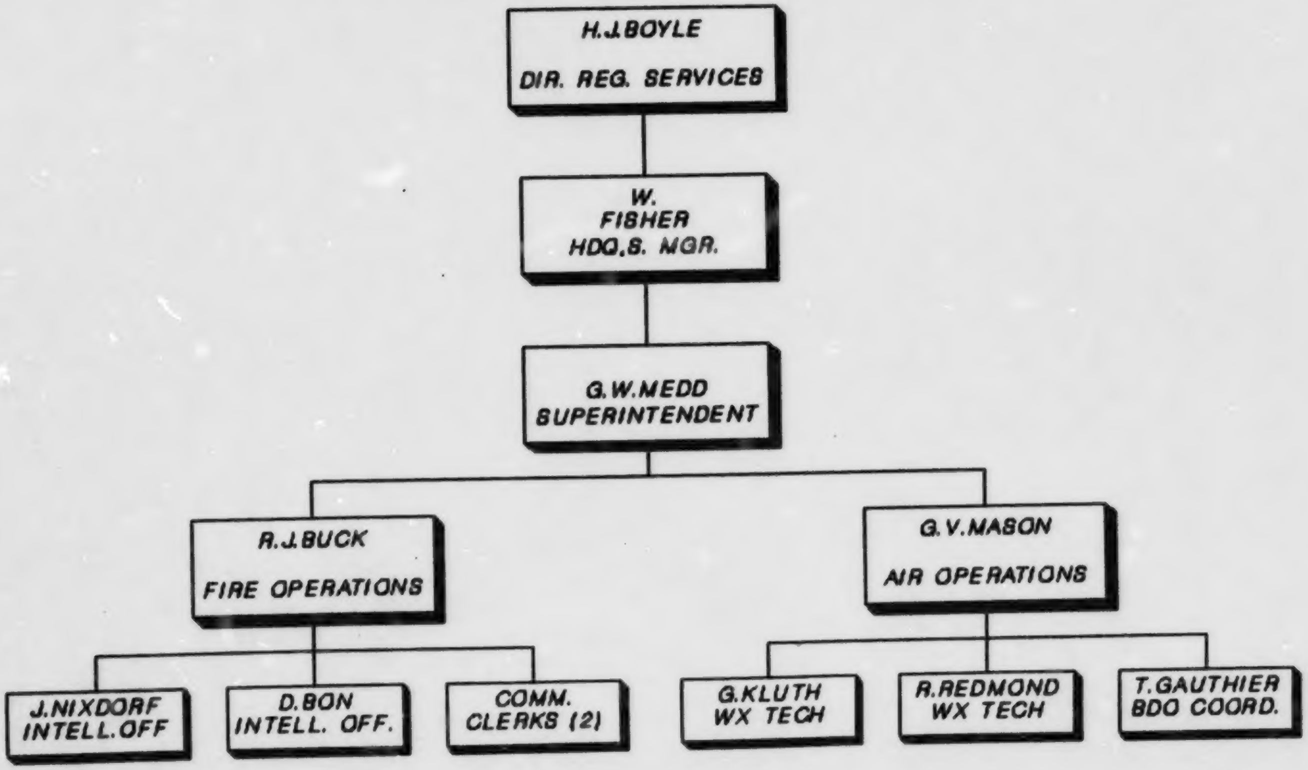
2. ROTARY WING

Aircraft	No.	Hours Bombing Contract + Casual	Litres Dropped Ret./ Foam / Water
All Types		4,433.1	2,706,075

Subtotal	Hours: 4,433.1	Litres		
			2,706,075	Water
			---------	Foam
			---------	Ret. Long-Term
			---------	Ret. Short-Term
		Total	---------	

TOTAL HOURS FLOWN		TOTAL LITRES	
		Water	2,706,075
		Foam	2,467,800
Fixed Wing	3,559.2	Long-Term	
Rotary Wing	4,433.1	Short-Term	
GRAND TOTAL	7,592.3		5,173,875

MANITOBA NATURAL RESOURCES
PROVINCIAL FIRE ORGANIZATION


H.J.BOYLE
DIR. REG. SERVICES
W.
FISHER
HDQ.S. MGR.
G.W.MEDD
SUPERINTENDENT
R.J.BUCK
FIRE OPERATIONS
G.V.MASON
AIR OPERATIONS
J.NIXDORF
INTELL.OFF
D.BON
INTELL. OFF.
COMM.
CLERKS (2)
G.KLUTH
WX TECH
R.REDMOND
WX TECH
T.GAUTHIER
BDO COORD.

Research, Development and Technology Transfer Needs

Agency: Natural Resources Manitoba

Date: January 10, 1992

Title or Area of Need: ECONOMICS OF FIRE OPERATIONS

Priority: (Check One)

High ☒ **Medium** ☐ **Low** ☐

Background: Because of the high and increasing costs of fire suppression there is a serious need to develop appropriate means of justifying all fire expenditures and of evaluating program effectiveness.

Proposal or Recommendation: Forestry Canada should make it a priority to develop standardized methods for justifying existing or enhanced fire program expenditures and for evaluating program effectiveness.

rrl\f-needs

Research, Development and Technology Transfer Needs

Agency: Natural Resources
Manitoba

Date: January 10, 1992

Title or Area of Need: FIRE MANAGEMENT DATA SYSTEMS

Priority: **(Check One)**

High ☒ **Medium** ☐ **Low** ☐

Background: The development of cost effective, user friendly, data information systems is required by most agencies in Canada. Since much of the information systems can and should be standardized it would be more cost efficient to develop a national system that can be adopted to meet the specific needs of the various agencies.

Proposal or Recommendation: Forestry Canada should make it a priority to develop standardized information systems that are capable of being adopted to meet the specific needs of all agencies.

Research, Development and Technology Transfer Needs

Agency: Natural Resources
Manitoba

Date: January 10, 1992

Title or Area of Need: SUPPRESSION PRODUCTIVITY AND EFFECTIVENESS

Priority: **(Check One)**

High ☐ **Medium** ☒ **Low** ☐

Background: There is a need to measure the productivity and cost effectiveness of various suppression systemsémethods.

Proposal or Recommendation: Carry out research to quantify productivity and suppression cost effectiveness of the following systems: water delivery, handline, waterbomber (skimmer vs. retardant) helicopter bucketing, foam, and I.A. crew size.

SASKATCHEWAN

PROVINCE OF SASKATCHEWAN

Exchange of Information

1991

1. GENERAL FIRE SITUATION 1991

Early season drought codes of up to 300 in April placed Saskatchewan in an explosive situation to begin the 1991 fire season. Fire numbers bear this out, with over 100 fires reported in April, compared to the normal 10-20.

Timely rainfall and moderate temperatures in May and June combined to reduce the hazard throughout our forested regions, and low numbers of fires occurred during these months.

Hazards rose again due to a hot, dry spell in July, resulting in late July and early August accounting for 40 percent of our total fires. Two campaign fires resulted from starts on August 10 and 11, burning over 28000 hectares.

Showers and cooler temperatures in late August through to mid-September effectively ended our fire season.

A total of 762 wildfires were reported during the 1991 season, down from the 1990 level of 897, and below the five year average of 884.

Winter precipitation levels are being closely monitored, since insufficient spring runoff could again place us in a critical situation due to the long term moisture deficit built up over the past 6 years.

2. AIRCRAFT UTILIZATION

Fixed Wing

Saskatchewan again operated a fixed wing aerial suppression fleet consisting of 6 - Grumman Trackers, 4 Canadair CL-215's, 3 PBY Cansos, and 5 Beech 55 Birddog aircraft.

The province was able to assist Ontario, Quebec, and the Northwest Territories with tankers under MARS exchanges, and received assistance from the Northwest Territories and Alberta during our fire bust in August.

Helicopters

The province contracted 5 helicopters for support of our man-up system, and direct suppression activities.

A total of 5,148.7 hours were utilized on fire related activities, of which 720.8 involved bucketing, with 7,516,460 litres of water being dropped.

Aerial Detection

The provincial detection system utilizes 5 contracted twin engine aircraft to fly regional patrols as required, supplementing the coverage provided by the provincial tower system.

Financial considerations may require the re-evaluation of the aerial detection portion of our budget for the coming season. All existing contracts expired in August, 1991 and requirements will be reviewed prior to the 1992 season.

3. Equipment Development and Testing

The province has converted a 13.7m (45 foot) van trailer into a portable 200-man fire cache complete with repair facilities. When the portable cache is dispatched to a fire, a mechanic is sent with it. The concept has worked well and a second van trailer will be converted.

Six - thirty head sprinkler kits were put together and distributed to various locations throughout the province.

A pre-fabricated fibreglass fire tower cupola was developed and installed in the Pasquia Hills. It is anticipated this prototype will significantly reduce maintenance and capital costs by extending the lifetime of the cupola.

4. FIRE PREVENTION ACTIVITIES

Smokey Bear, along with a uniformed officer visited 65 schools in the province delivering the "Fire Prevention" message to 6214 students. The officer discussed both provincial and local fire prevention concerns. Smokey handed out fire prevention materials and reminders to both students and teachers.

5. TRAINING

The Forest Fire Management Branch either coordinated or delivered training courses to 1168 persons up to December 31, 1991. In winter and early spring of 1992 several Aviation Management, Sector Boss, and Fireline Supervision courses will be provided to interested parties. In addition, there are 10 courses scheduled in January, February and March of 1992 aimed at volunteer and rural fire departments who require training in the area of prairie and forest fire suppression. Courses provided in the branch training curriculum are:

Basic Fire Fighting
Crew Boss
Aviation Management
Wildland/Urban Interface Training for Rural Fire Departments
Sector Boss
Fire Clerk
Fire Simulator Exercises
Sprinkler System Operation
Fire Line Supervision

The Forest Fire Management Branch is presently working with Western Canadian Provinces and Territories, as well as Forestry Canada and Parks Canada to develop a Multi-Agency concept of training which will provide for standardization of training and the sharing of technological information and facilities.

6. PRESCRIBED BURNING

There was no prescribed burning within the Province in 1991. The Fire Management Branch is actively working to introduce a prescribed fire program to Saskatchewan. In the early fall of 1991, a multidisciplinary resource managers group dedicated to utilizing prescribed fire was established. Plans are well underway with the assistance of CFS and Alberta to initiate a series of prescribed fires for wildlife habitat improvement. From this small beginning, we are confident that prescribed fire will become an important and accepted resource management process.

7. PUBLICATIONS, FILM AND VIDEO TAPES

A video titled "Smokey Bear" was produced in the spring of 1991 which was used to explain the role of Smokey Bear and identify fire prevention concerns to students ages 8 - 10 years. The video is 10 minutes in length and used forest fire footage from existing stock and additional footage was shot with the assistance of the SIAST Audio Visual Department. Each resource region in the province received two copies of this video to use with classroom and public presentations.

8. ORGANIZATIONAL CHANGES

The Forester 3 position which had been responsible for the development, and initial implementation phases of the provincial IFMIS program, has been returned to forestry branch along with position incumbent Henry Desjarlais.

Plans are being made to establish a permanent position at fire management to continue the development of IFMIS on an operational basis, as well as to carry out other research projects as required.

The branch will be staffing the new position of Air Operations Manager early in 1992.

9. EDUCATION REPORT

Not Applicable.

10. OTHER ITEMS OF SPECIAL INTEREST TO THE COMMITTEE

The IFMIS decision support system was utilized in two regions during the 1991 season, and functioned very well in its intended role.

Further expansion of the operational phase of this program is planned to include all forested regions of the province during 1992.

AIRCRAFT UTILIZATION REPORT

1. Fixed Wing

Air Craft Type	No.	Hours Bombing	Litres Dropped Ret./Foam/Water
Grumman Tracker	6	337.8 Prov. owned	1,214,691 L Ret.
DC 6	1	43.7 Casual	468,238 L Ret.
CL-215	4	363.9 Prov. owned	12,166,914 L Foam
			2,067,521 L Wat.
PBY CANSO	3	204.1 Prov. owned	2,931,260 L Foam
			698,266 L Wat.
TOTAL	**14**	**949.5 Hours:**	

Litres:		
	Foam	**15,098,174**
	Retardant	**1,682,929**
	Water	**2,765,787**
Total		**19,546,890**

2. Rotary Wing

Aircraft Type	No.	Hours Bombing	Litres Dropped Water
Long Term Contract	5	128.7	1,156,275 L
Short Term Contract	32	592.1	6,360,185 L
TOTAL	**37**	**HOURS 720.8**	**7,516,460 L** Wat.

TOTAL HOURS FLOWN (FIRE BOMBING)

Fixed Wing	949.5
Rotary Wing	720.8
GRAND TOTAL	**1,670.3**

TOTAL LITRES

Water	10,282,247 L
Foam	15,098,174 L
Retardant	1,682,929 L
Total	**27,063,350**

Research, Development and Technology Transfer Needs

Agency: Sask. Parks & Renewable Resources **Date:** Jan., 1992
Forest Fire Management

Title or Area of Need: Fire Communications

Priority: **(Check One)**

High ☒ **Medium** ☐ **Low** ☐

Background: Increasing demands for up-to-date fire communications has placed demands on our resources that cannot be handled.

Proposal or Recommendation: Revived methods of satellite communication that may allow voice/data transmission to remote distant locations.

Research, Development and Technology Transfer Needs

Agency: Sask. Parks & Ren. Resources
Forest Fire Management

Date: Jan., 1992

Title or Area of Need: National Training and Certification

Priority: (Check One)

High ☒ **Medium** ☐ **Low** ☐

Background: With the increased trend towards sharing fire fighting resources it is becoming very important that agencies are training to a common standard.

Proposal or Recommendation: Continue to work towards a coordinated approach in the development and delivery of high level fire training.

Research, Development and Technology Transfer Needs

Agency: Sask. Parks & Ren. Resources
Forest Fire Management
Date: Jan., 1992

Title or Area of Need: Prescribed Fire

Priority: (Check One)

High ☒ **Medium** ☐ **Low** ☐

Background: This province has been slow to realize the value of utilizing controlled burns to meet various forestry, wildlife and other agency needs regarding forest fuel alterations.

Proposal or Recommendation: A controlled wildlife burn to be completed in the spring of 1992.

Research, Development and Technology Transfer Needs

Agency: Sask. Parks & Ren. Resources
Forest Fire Management

Date: Jan., 1992

Title or Area of Need: Fiberglass Fire Tower Cupula

Priority: **(Check One)**

High ☐ **Medium** ☒ **Low** ☐

Background: Ongoing yearly maintenance of existing fire tower cupulas has progressively increased each year requiring increased labour and expenditure commitments.

Proposal or Recommendation: Determine a feasible alternative to the wooden tower cupula that meets safety standards and is cost effective.

Research, Development and Technology Transfer Needs

Agency: Sask. Parks & Ren. Resources
Forest Fire Management

Date: Jan., 1992

Title or Area of Need: Forecasting Fire Severity

Priority: (Check One)

High ☒ **Medium** ☐ **Low** ☐

Background: Ever increasing costs of forest fire suppression have forced agencies to forecast yearly fire expenditures well prior to season end.

Proposal or Recommendation: Review and rationalize the correlation between fire expenditure and spring drought codes.

Research Status or Completion Report

Agency: Sask. Parks & Renewable Res.
Forest Fire Management Branch

Date: Jan., 1992

Title: Fire Management Decision Support Systems

Key Words: Computer, Information Systems, Data Processing

Current Year Resources:

Person Years: 1.0 **Funding:** Project Specific

Timetable:

Starting Date: 1988 **Completion Date:** Ongoing

Objective: To provide timely and reliable fire information that assists fire managers in fire decisions.

Work Done: In conjunction with Forestry Canada assist in development of a Saskatchewan IFMIS operation in a Regional and Provincial setting.

Reports and Other Data Available: May be obtained through Bryan Lee at Forestry Canada, Edmonton.

Project Leader: Bryan Lee, Forestry Canada **Year:** 1991

ALBERTA

DEPARTMENT OF FORESTRY, LANDS AND WILDLIFE
ALBERTA FOREST SERVICE

CANADIAN COMMITTEE ON FOREST FIRE MANAGEMENT
EXCHANGE OF INFORMATION
OVERVIEW: 1991
FIRE SITUATION AND STATISTICS

Pre-Season Precipitation

Snowfall during the winter of 1990-91 in Alberta was generally normal to above normal. The boreal forests of northern Alberta received largely above normal precipitation during November 1, 1990 to April 30, 1991. Fort Chipewyan in north eastern Alberta achieved the greatest positive precipitation anomaly during this period recording 160% of normal precipitation. The east slopes of the Rocky Mountains also received normal to above normal precipitation. The most significant amounts were recorded at Edson in west central Alberta with 151% of normal and the Crowsnest Pass at the southern extremity of the province where 126% of normal precipitation was measured.

A notable exception in the over winter precipitation regime was found in east-central Alberta. The southern districts of Slave Lake and Lac La Biche Forests experienced a consecutive winter of well below normal precipitation. Generally 50% of normal snow and rainfall occurred in these regions. Consequently starting drought code (DC) values were highest in these areas; some districts began the 1991 fire season with DC values over 400.

Spring Fire Situation

The cumulative dryness experienced in east-central Alberta generated a significant risk of man-caused fires in mid-April as a strong upper level ridge built over the province. Warm, dry conditions persisted for a two week period. During April 13 to 25, a total of 80 fires occurred in Alberta, the majority striking southern Slave Lake and Lac La Biche Forest districts. Most of the fires erupted in the settlemet areas resulting in little timber loss. By May 1, a provincial total of 122 fires had been recorded with 1118 hectares (ha) burned over. Over 80% of the burnt area was in grassland reflecting the characteristically heightened flashy fuel hazard that frequently develops in spring.

Early May was ushered in by cooler, dry weather across the province. Generally lower fire danger levels prevented serious problems, however, numerous small man-caused fires continued to affect the high DC areas of Lac La Biche and Slave Lake Forests. By May 11, these two forests had logged 120 of the 210 fires recorded in Alberta.

The first heavy precipitation event of the season occured during May 12 to 14. The southern half of the province received from 25 to 60mm of precipitation. Higher elevations in the Rockies and Swan Hills were the recipients of several contimetres of spring snow. Temperatures recovered after May 15 as another high pressure area built over Alberta behind the major precipitation system. Fire danger levels began to recover in northern Alberta; these districts did not receive heavy precipitation from the early May storm. Cooler, dry weather returned May 20 and persisted until the end of the month. The first extensive lightning outbreaks of the 1991 season occurred May 30-31; northern Alberta received 66 lightning-caused fires during this outbreak. No significant losses resulted from the new fires. By June 1, Alberta had recorded 325 fires and 3100 ha of protection area burned over; only 880 ha of the total burnt area was merchantable timber.

July to September: A Generally Quiet Fire Season

The next major precipitation event in Alberta arrived in early June. An intense upper trough brought heavy rains to much of the province from June 5 to 10. The boreal forests of northern Alberta received the most significant amounts of rain. Several stations received over 100mm during this event. Monthly totals exceeded 200mm at some stations; during June, Trout Mountain lookout in northern Slave Lake Forest was soaked with 275mm of rain, over 300% of normal.

An upper trough pattern persisted across Alberta through most of June. Cool, damp weather with intermittent shower activity suppressed ignition potentials considerably and resulted in a low fire incidence. On June 25 the provincial fire total stood at 384 with 4618 ha burned over. A drier situation during the final week of June in northern Alberta allowed a modest recovery in ignition potentials. Lightning fire activity increased during this period as crews suppressed 61 wildfires. All of these fires were brought under control or extinguished with minimal losses.

Fire business remained low through July despite a somewhat spotty distribution of precipitation. Temperature and relative humidity values displayed few extremes in the absence of prolonged ridging. Frequent shower and wet thunderstorm activity lowered ignition potentials and generated heavy rain in west-central and northern Alberta. The Lac La Biche districts of eastern Alberta experienced drying for the month overall with most stations receiving only 30 to 40% of normal precipitation. Conditions were similarly dry in the southern east slopes of the Rockies. At the end of July a total of 548 fires with 4746 ha burned over was recorded.

A warming trend began in August as a strong upper ridge became established over Alberta. The ridging pattern persisted for three weeks over most of the province. Thunderstorm activity increased with the onset of higher temperatures. Ignition potentials also recovered during the ridge build-up. Between August 1 to 20, 156 lightning-caused and 34 man-caused fires occurred. Successful initial attack kept losses low with only 900 additional hectares burned over. Very dry conditions persisted in the eastern Alberta Forests of Lac La Biche and Athabasca. Some stations received only 20% of normal precipitation for the month. Extreme DC values were typical in these forests at the end of August with several stations reporting DC values over 600 and one location climbing above 700. With the approach of the fall harvest season in the agriculture areas of these particularly dry forests, concern shifted to the prevention of man-caused fires.

Light precipitation occurred in the very dry forests of eastern Alberta in early September. Rainshower activity through mid-September dampened ignition potentials significantly. From September 1-20, only 16 fires were actioned across the province. A pronounced warming and drying trend developed during the final week of September. A brief return to cool conditions occurred in the northern half of the province in early October, however, the upper ridge rebounded by October 5. Warm and dry conditions created easy brush burning conditions during October 10 to 15. Serious fire problems developed in counties and native colonies south of Lac La Biche Forest. Brush and grass fires claimed a small number of structures while burning over 18,000 ha of range land.

An abrupt reversal in weather conditions occurred on October 15 and 16 throughout Alberta. An outbreak of arctic air accompanied by moderate snowfall brought an early winter and effectively ended the fire season. Most forest received measurable snowfall during this two day period. The acrctic air deepened considerably during the latter half of the month. Maximum temperatures were generally 10 to 20 degrees below seasonal values in most areas. By December 16 the provincial fire season statistics stood at 921 fires and 6129 ha burned over. These statistics based on the information provided to December 13, 1991.

1991 FIRE STATISTICS

Total Fires	921
Hectares Burned	6129
Forest Protection Base Budget	18,381,454
Staffing Costs Forest Protection	6,346,649
Preparedness Costs	15,334.897
Suppression Costs	13,261.295

II. Aircraft Utilization

We continue to rely heavily on the use of aircraft, to meet our initial attack requirements and to conduct other forestry related projects.

TOTAL HOURS FLOWN OF ALL PROJECTS

YEAR	FIXED WING	ROTARY WING	TOTAL
1982	14,530	42,659	57,189
1983	6,425	21,113	27,538
1984	7,815	26,358	34,173
1985	5,952	26,532	32,484
1986	3,040	20,963	24,003
1987	4,095	23,742	27,937
1988	4,202	25,526	29,728
1989	3,615	19,628	23,244
1990	8,085	22,111	30,201
1991	6,493	25,363	31,863

ROTARY WING UTILIZATION

YEAR	HOURS FIRES	HOURS MAN-UP	HOURS ALL USES
1982	32,654	5,017	42,659
1983	2,549	10,461	21,113
1984	6,051	9,965	26,358
1985	4,291	11,948	26,532
1986	1,932	8,676	20,963
1987	5,200	10,574	23,742
1988	3,856	6,431	25,526
1989	2,951	8,446	19,629
1990	8,988	12,129	22,111
1991	3,680	6,603	25,363

One change occurred in the government owned or contracted fleet in 1990. The Beech Navajo was sold to private industry.

GOVERNMENT OWNED		CONTRACTED	
Beech, King Air 300	3	Medium rotary wing	8
DeHavilland, Dash 8	1	Douglas, B-26	11
Bell, 206B	5	Douglas, DC-6	3
Bell, 222 U	1	Cessna, 310	5
Canadair, CL-215	4*	Aerostar	3

* Two CL-215's are owned by the federal government and leased to the province.

AIRTANKER PROGRAM

The various airtanker groups actioned a total of 126 fires in 1991.

DC-6	32	fires (40%)
B-26	43	fires (55%)
CL-215	25	fires (31%)

The CL-215 Airtankers were dispatched twice through the MARS Agreement, once to each Ontario and Quebec.

III. EQUIPMENT DEVELOPMENT & TESTING

Testing of new product lines has lessened somewhat from previous years. Currently we have 16 formal test projects on the books and the most significant focus on water delivery systems. We are evaluating small pumps (initial attack), volume pumps and high performance pumps. Our objective for initial attack is optimum performance, good serviceability with a minimum weight. Drought conditions in the east central part of the province has prompted us to look at high volume pumps where pressure isn't a factor but large quantities of water are required to handle the large deep ground fires.

Ground foam application is pretty much standard operating procedure now and we have 4 systems and associated fitting in place (200 + kits) distributed province wide.

IV. Fire Prevention Activities

Public education was again the main thrust of the prevention program. Displays at trade fairs, school visits, and advertising in the media, carry the message. The media advertising is targeted at 2 primary groups, they continue to be - recreationists and resident landowners. Our objective is to maintain a media mix to effectively communicate the importance of protecting the forest.

The forest guardian system in place in the high use recreation areas of Alberta continues to be an important prevention education tool. The fire permit continues to be a key component of the prevention program in terms of public education when dealing with landowners.

The Fire Prevention I course was held again in April 1991 and is planned again for 1992. Attendance by co-operating agencies is encouraged (i.e., representatives, counties, M.D.'s as well as new AFS employees) that issue fire permits. Use of a wildfire investigation team for initial fire investigation continues to be used for major man-aused fires. Investigations have been conducted on fires in specific areas where deliberate setting of fires has been suspected. The Fire Prevention II course was not conducted in 1991.

The Alberta Forest Service and Bertie Beaver continue to be members of Crimestoppers. The Crimestoppers organization is based in Edmonton but is located in excess of 34 communities throughout Northern Alberta.

The Forest Fire Prevention Advertising consisted of:

1. The **"MATCHES"** commercial was utilized again in 1991. The 427 fire number has been a very effective fire reporting aid.

A review of the Alberta Forest and Prairie Protection Act was finalized. Recommended amendments have been submitted. The Forest and Prairie Amendment Act was assented to in June of 1991. The penalties have increased so that the maximum fine is now $5,000 rather than $1,000 for the contravention of sections 18-22 of the Forest and Prairie Protection Act.

Many of the forest regions continue to be proactive taking opportunities available to discuss the problem of Wildfire in the Wildland/Urban Interface. Crosstraining and instruction is taking place. The video, "Beware and Prepare" was introduced and has been provided to all ranger districts in Alberta for community education purposes as well as presentations to urban/rural firefighting agencies. "The Partners in Protection" video has been completed and is expected to receive wide circulation.

V. TRAINING

1991 has been a very busy year for the Forest Technology School in the area of videodisc training.

The closing down of the Calgary division of ACCESS Television has caused a substantial delay in the release of the "Wildfire Assessment" training course. This course is now completed and undergoing evaluation in the field. All indications point to it becoming a very successful course. ACCESS in Edmonton will be marketing the disc sometime after the new year.

Requests continue to come into the Forest Technology School for the "Principles of Fire Behaviour" training course. This course is presently undergoing revision in order to facilitate the new hardware which has surfaced on today's market.

The "Forest Fire Simulator" discs were revised this summer to include additional video and an upgrade to the audio. Control software was also rewritten to include two laser players in order to allow access to twice the amount of video that was possible with the old version. The success of the fire simulator continues to grow. The Forest Technology School is presently undergoing talks with the British columbia Ministry of Forests, the forest Protection Branch, and the British Columbia Institute of Technology for the installation of an FTS fire control simulator at their location. We are also undergoing talks with the Australian National University on the same note.

Projects identified for the upcoming year include a generic disc to address "Fire Safety" training. It is hoped that this will be a joint development by agencies across Canada.

This summer was not very productive in terms of forest fire videotaping due to our slow fire year. It did generate some scripted urban interface shots however, that allowed FTS and AFS in ccoperation with the partners in Protection Group to produce a training video entitled "Partners in Protection". The 19 minute video takes a look at the problems associated with urban interface fires and invites all agencies to a symposium in Jasper in the fall of 1992 to iron out these problems.

The fire management training section of FTS has also broadened its horizons by assisting other departments in their videodisc training needs. One such project is a videodisc on "Manual Stand Tending" developed in cooperation with the Reforestation Branch.

In October, a meeting was held at the Forest Technology School to discuss multi-agency training. Based on the results of the meeting, the 1992 Advanced Fire Behaviour Course will be held as a multi-agency course. This course will be used to test the proposed multi-agency concept and act as a model for developing other courses.

The Division Level Course will continue to be offered as an Alberta Forest Service course in 1992.

The Forest Technology School continued to be involved with the cooperative 3 year Prescribed effects study which is nearing completion.

FTS Staff provided assistance to the State of Alaska in the form of on-site training and interpretation of the Canadian Forest Fire Danger Rating System. Also, personnel from Alaska attended the 1991 Advanced Fire Behaviour Course.

Negotiations have been finalized with the U.S. Forest Service and NARTC to hold "Fire in Resource Management" at the Forest Technology School in 1993. This course will be open to all interested agencies.

As our entire certification system is built on the trained firefighter, field training remains one of our most important programs. Three hundred and seventy eight firefighters, fifty four cooks, twenty two timekeepers and sixty squad bosses were trained in 1991.

FOREST TECHNOLOGY SCHOOL

Hinton, Alberta

FIRE MANAGEMENT TRAINING COURSES - 1991

COURSE	DATE HELD/ SCHEDULED	CANDIDATES IN-SERVICE	CANDIDATES OUT-OF-SERVICE	COURSE HOURS
Crew Boss	Feb. 19-23		23	40
Division Level Fire	Scheduled for Feb. 1992			
Cat Boss	March 12-14	7	14	24
National Parks Fire Command Team	April 16-18		27	32
A.A.O. Strategy and Tactics	April 9-11	11		24
Advanced Fire Behavior	April 8-12	17	13	28
Fire Prevention I	March 25-28	12	3	32
Airtanker Base Manager	April 22-27	7		40
Initial Attack Crew Leader	April 21-28	9	10	60
Initial Attack Crew Leader Refresher	Not held in 1991			27
Industry Crew Boss	Not held in 1991			32
Prescribed Fire	Sept. 23-27	15	10	40
Sector Level Fire	Oct. 21-Nov.1	21	13	80
Fire Prevention II	Not held in 1991			
HELITACK				
Spotter Recertification	April 14-23		15	70
Recruits - Members	April 27-May 17		25	170
Recertification (3 groups)	April/May		48	50
Helitack Pilot Training	May 7-8		10	18

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VI. Prescribed Burning

There were 11 prescribed burns conducted during 1991 for a total of 3866 hectares.

The integrated workshop on Prescribed Fire Management in Alberta was carried out February 25-27, 1991 at the Forest Technology School, Hinton. The session was well represented by government and industry and provided an insight towards our future direction in the use of prescribed fire.

A formal prescribed burn course was held September 23-27, 1991 at the Forest Technology School, Hinton with 27 candidates in attendance. We are now in the process of developing a prescribed burn data entry program for analysis, review of fire effects and as an aid in prescribing future prescriptions windows for upcoming burns.

	Completed	Ha Burnt	Pending	Ha Proposed
Forest Industry (Silviculture)	0	0	0	0
Public Lands (Range)	2	1378	3	1339
Fish & Wildlife (Habitat)	5	1595	12	2267
Alberta Forest Service				
Silviculture	0	0	11	1309.4
Range	0	0	5	470.0
Hazard	4	893	0	0
Alberta Forest Service Total	4	893	16	1779.4
Grand Total	11	3866	28	4046.4

VII. Video Tapes

Publications - In cooperation with the FTS and in cooperation with the Partners in Protection group produced a training educational video entitled "Partners in Protection". This video describes the concerns associated with wild land urban interface fires and makes the viewer aware about the proposed symposium planned for Jasper Park Lodge in September 1992.

VIII. Organizational Changes

Bill Bereska - Fire Behaviour Officer, Provincial Forest Fire Centre, from field , Forest Protection Officer, Lac La Biche forest. Replacing T. Van Nest

Norman Olsen - Fire Operations Supervisor, from Chief Ranger, Bow/Crow Forest. Replacing Owen Bolster.

Bill Griggs - Head of Telecommunications - Retired/91

Owen Bolster - Fire Operations Supervisor - Retired/91

Claude Lefebvre - Communications Officer - Retired/91

X. Other Items of Special Interest

A. STUDENT FIRE CREW PROGRAM

This program consists of three crews with 18 to 25 crewmembers employed during the fire season, and located in the Bow/Crow, Rocky/Clearwater and Edson Forests.

Candidates for the program are students recruited from the University of Alberta Forestry, NAIT Forest Technology Program, Lethbridge Community College and general/science people from University of Alberta and University of Calgary and Adult Vocational College Forestry Worker programs.

The primary purpose of this program is to provide support action resources on fires in the above forests and export the crews should other forests require their need. When not on fires, crews work at various projects in their forests, on various resource management work as well as taking training in firefighting and gaining employment experience.

Fires actioned by these crews in 1991 were as follows:

Edson Crew	5 fires
Rocky/Clearwater Crew	7 fires
Bow/Crow Crew	2 fires
Total	14 fires

This year the Rocky crew was exported to Athabasca Forest to work on a "D" Class fire for approximately 5 days. The crew from Bow/Crow were exported to the Yukon where they worked support action on an "E" Class fire for approximately 12 days, in the Watson Lake District. Due to budget constraints the Student Fire Crew Program will be discontinued for 1992.

B. Helitack (Rappel) Program

During 1991 the Helitack was actioned 132 fires. Of this total the crews rappelled on 24% of the fires and conventionally actioned 76%. Seventeen new recruits were invited to the one month training course of which eleven went on in the program.

In 1992 the program will again consist of 8 medium rotary wing and 8-7 person rappel crews. An additional 2-4 person crews will be added on a 1 year trial period for rappelling out of 2 intermediate helicopters (Bell Longranger III and either a 350B1 or 355 F1).

C. Initial Attack Program

The 1991, 37 crews working out of the forest ranger districts carried out initial action on 451 fires,and actioned another 34 fires in adjacent forests and out of province. The crews vary in size from two to five people per crew depending on local needs, and continue to form an integral part of the Initial Attack Program.

FOREST	**INITIAL ACTION (Within Forest)**	**INITIAL ACTION (Outside Forest**
Athabasca	47	5
Bow/Crow	14	1
Edson	7	2
Footner Lake	33	6
Grande Prairie	27	3
Lac La Biche	93	4
Peace River	41	4
Rocky/Clearwater	18	1
Slave Lake	123	9
Whitecourt	48	1
TOTAL	**451**	**34**

The Initial Attack Program annually actions the majority of Alberta's fires (averaging between 55-65%). This year we sent 6 initial attack crews on export to Ontario where the crews had the opportunity to work on fires in Dryden Fire Region during their tour.

D. FIRE WEATHER SERVICES

Forecasting Program

Although on site meteorologist service was not required on any wildfires during 1991, the AFS weather section provided forecasting services in support of the spruce budworm B.T. spraying program. The success of the B.T. spraying is highly sensitive to atmospheric conditions. This program also provided the first opportunity to deploy the portable satellite system (POSSY) weather intelligence hardware based on the Anikom 100/EDM DS48C system. The POSSY is normally intended for weather support on major wildfires.

Remote Automatic Weather Stations

The AFS remote automatic weather station (RAWS) network saw minor changes in 1991. Although the total number of stations remained at 21 the Ya Ha Tinda station in northern Bow/Crow Forest was converted to a Handar 570A satellite telemetry station. This produced a mix of 15 FTS UHF telemetry stations and 6 Handar satellite-based telemetry stations.

Additional FTS sites were scheduled to be changed over to Handar equipped sites in 1991, however, procurement was delayed until fall. Four Handar RAWS are expected in December and should be operational at several current FTS sites along the east slopes of the Rockies. In 1992 an additional five new RAWS locations will be evaluated.

Lightning Detection System

The planned upgrade of the AFS LLP-based network to next generation ALDF-APA-NDS standard was not accomplished due to delays in establishment of the required communications system.

The upgraded system was put in place in October and is expected to be operational for the 1992 fire season. Expanded data sharing will be explored with similiar networks in B.C and the NWT. Additional sites in the southern plains of Alberta will likely be added during the next few years, which should enhance the system's effectiveness for the cooperating agencies and public utilities.

The Atmospheric Environment Service (AES) at the Alberta Weather Centre in Edmonton has integrated the lightning detection information with Doppler radar data. This will provide severe weather forecasters with a more complete picture of thunderstorm development and behaviour as well as having potential application in fire management activities.

E. Telecommunications

During 1991, considerable progress was made in several areas.

1. Lightning Detection System

   Delays in establishing data communications facilities prevented cutting over from the old to the new equipment in time for the 1991 season.

   All the obsolete Lightning Location and Protection, Inc. type 80-02 equipment has now been replaced by the newer 141 series, ready for the 1992 season.

2. Forest Fire Communications System

   Replacement of old equipment is in process. Sufficient new types have been acquired to replace the "Campaign" system.

   The enhanced capability of modern radios has been used to upgrade the system, eliminating some unsatisfactory limitations.

F. Detection

Infrared Scanner Development

Further evaluation of the FLIR Systems Inc. scanner coupled with a Global Positioning System (GPS), video recorder (VCR) and hard copy thermal printer was completed.

The FLIR, GPS, VCR and printer were installed on a Cessna 310 Birddog aircraft attached to a CL215 tanker group to assist in maximizing the effectiveness of the fire bombing operations.

The combination of a high resolution infrared scanner coupled with a fast airplane proved to be very effective.

The ability to see through smoke gave the Air Attack Officer a stategic advantage in determining where to place retardant loads and what effectiveness the drops were having in controlling fire spread.

The secondary ability to provide preliminary infrared scans on fires in the early mop-up stages also proved extremely effective for the detection of hot spots and at significantly lower operating costs compared to the traditional method of using helicopters.

Interfacing of the GPS with the FLIR also provided accurate location information for both identyfying hot spots and providing the method to return to the same spot time after time.

GPS has proven itself to be extremely valuable and cost effective in both F/W and RW operations and will be a mandatory requirement in future contracts.

It is planned that four FLIRS will be leased for the 1992 fire season.

G. Presuppression Preparedness System

In 1991 the Intelligent Fire Management Information System (IFMIS) was used as the method of planning presuppression resource requirements in five forests, Bow/Crow, Grande Prairie, Lac La Biche, Slave Lake and Whitecourt. Two other forests, Athabasca and Peace river used it for testing and training.

The Forest Protection Branch Plans to adopt IFMIS for presuppression planning in all forests for the 1992 fire season.

1. The program will operate on the 486 computers.
2. Topography data will be used and evaluated throughout the province.
3. Data transfer between forests and Provincial Fire Center will be done using present IOS terminals and data lines.
4. The new version of IFMIS will provide fire managers with an advanced system using optimization to determine possible positioning of presuppression resources to obtain the best possible suppression results with reduced spending.

Research, Development and Technology Transfer Needs

Agency: Dep't. of Forestry, Lands & Wildlife. Alberta Forest Serivce. Forest Protection Branch

Date: January 1992

Title or Area of Need: Rate of spread validation in mountainous terrain.

Priority: (Check One)

High ☐ **Medium** ☒ **Low** ☐

Background: The influence of slope and aspect on the Canadian Forest Fire Prediction System is not well documented in terms of comparison of prediction to actual fire behaviour.

Proposal or Recommendation: That the Alberta Forest Service and Forestry Canada conduct a co-operative study. The Alberta Forest Service has approved a number of prescribed burns scheduled in mountainous terrain, for other resource management needs that will be used to collect data for this project.

Research, Development and Technology Transfer Needs

Agency: Gov't of Forestry, Lands & Wildlife. Alberta Forest Service. Forest Protection.

Date: January 1992

Title or Area of Need: Fireline Productivity/Effectiveness

Priority: (Check One)

High ☐ **Medium** ☒ **Low** ☐

Background: The most recent fireline productivity/effectiveness research conducted in Alberta was during the 1980's. Most of the fire crew production rates were acquired through experimental burns and reflect initial attack scenarios. Follow-up research particularly on sustained action is still required.

Proposal or Recommendation: That the Alberta Forest Service and Forestry Canada conduct a co-operative study to obtain additional research data.

Research, Development and Technology Transfer Needs

Agency: Gov't. of Forestry, Lands & Wildlife. Alberta Forest Service. Forest Protection.

Date: January 1992

Title or Area of Need: Firefighter Health, Safety and the Environment.

Priority: **(Check One)**

High ☐ **Medium** ☒ **Low** ☐

Background: - Smoke and its effects on the firefighter.

- Fire resistant clothing.
- Retardants: long and short term effects on both the firefighter and the environment.
- Potable water quality.
- Stress management.
- Fire shelter.
- Helicopter safety.

Proposal or Recommendation:

Research/information exchabge nationally and suggested recommendations.

rri\f-needs

Research Status or Completion Report

Agency: Dep't. of Forestry, Lands and Wildlife. Alberta Forest Service. Forest Protection Branch

Date: January 1992

Title: Forest Fire Equipment Subcommittee.

Key Words:

Current Year Resources:

Person Years: None

Funding: CCFFM funds approx. 80% of travel costs.

Timetable:

Starting Date: 1983

Completion Date: On-going

Objective: Technology transfer related to ground wildfire suppression equipment.

Work Done: The provinces, federal government and the United States are [illegible] represented to discuss new firefighting equipment, safety concerns and to ensure duplication of effort is kept at a minimum. This group also prepares, reviews and adopts national standards.

Reports and Other Data Available: Minutes on annual meetings available.

Project Leader: Gordon Ramsey, PNFI

Year: Annual

Note: NWT - 1992
AB - 1991

Research Status or Completion Report

Agency: Gov't. of Forestry, Lands & Wildlife. Alberta Forest Service. Forest Protection.

Date: January 1992

Title: Intelligent Fire Management Information System Modelling..

Key Words:

Current Year Resources:

Person Years: 7.75 years

Funding: $21,800.00

Timetable:

Starting Date: 1988

Completion Date: December 1991

Objective: To develop an Intelligent Fire Management Information System.

Work Done: Software package developed.

Reports and Other Data Available:

Project Leader: Bereska

Year: 1991

Research, Development and Technology Transfer Needs

Agency: Gov't of Forestry, Lands & Wildlife. Alberta Forest Service. Forest Protection.

Date: January 1992

Title or Area of Need: National Training and Certification

Priority: **(Check One)**

High ☒ **Medium** ☐ **Low** ☐

Background: With the increasing trend of fire management agencies to share resources, it is becoming important that we establish minimum certification criteria for fireline positions to enable us to work with each other using standard terminology and technically qualified staff. With respect to training facilities, only two agencies in Canada have the infrastructure (training schools) so it is more cost effective for outside agencies to rent the existing facilities rather than build their own or build up a cadre of instructors.

Proposal or Recommendation: Develop a set of nationally acceptable minimum qualifications for the various fireline positions common to all agencies. The air attack officer minimum qualifications has already been met. Now working on initial attack leader, sustained action leader, overhead team leader, and fire behaviour officer through CIFFC.

Research, Development and Technology Transfer Needs

Agency: Gov't of Forestry, Lands & Wildlife, Alberta Forest Service, Forest Protection.

Date: January 1992

Title or Area of Need: Fire Occurrence Prediction

Priority: (Check One)

High ☒ **Medium** ☐ **Low** ☐

Background: Development of a usable fire occurrence prediction system would greatly enhance preparedness planning and initial attack strategies.

Proposal or Recommendation: Possibly a co-operative effort with Ontario's initiatives would be beneficial.

Research, Development and Technology Transfer Needs

Agency: Gov't of Forestry, Lands & Wildlife. Alberta Forest Service. Forest Protection.

Date: January 1992

Title or Area of Need: Fire Danger and Behaviour Rating in Forest and Range Land Environments.

Priority: (Check One)

High ☒ **Medium** ☐ **Low** ☐

Background: This study formalizes the need for the continued development, evaluation, interpretation, and application of the Canadian Forest Fire Danger Rating System (CFFDRS) in order to further extend its usefulness. It also recognizes the opportunity to formulate improved methods for the assessment and prediction of wildfire behaviour in terms which are useful to fire management agencies by regional adaptation of existing knowledge, techniques, etc.

Proposal or Recommendation: Canadian Fire Danger Rating Group to consider this on an on-going basis. The recent proposal to integrate United States and Canadian systems will impact this need.

Research, Development and Technology Transfer Needs

Agency: Gov't. of Forestry, Lands & Wildlife. Alberta Forest Service. Forest Protection Branch.

Date: January 1992

Title or Area of Need: Continued research and development into forestry application of infrared sensing technology.

Priority: (Check One)

High ☒ **Medium** ☐ **Low** ☐

Background: There is a great need to improve on the precise, real time, capture, analysis and transmittal of infrared information both on active fires and in a detection mode following storm paths.

Proposal or Recommendation: That existing available technology continues to be researched and evaluated and where practical brought togehter in a cost effective/beneficial manner to provide a complete and thorough system for use in fire detection and suppression activities. AFS must continue to set acceptable standards for the use of infrared equipment in the field of wildfire use.

rr\l-needs

Research, Development and Technology Transfer Needs

Agency: Gov't. of Forestry, Lands & Wildlife. Alberta Forest Service. Forest Protection.

Date: January 1992

Title or Area of Need: Forest Fire Retardant Foam Research - Ground and Aerial Application.

Priority: **(Check One)**

High ☒ **Medium** ☐ **Low** ☐

Background: The AFS, like other agencies are learning as we go. The CL-215 have had foam capability since 1987. There is a need to gather all information from different users centrally on the various products, test results, etc. Since 1988, the use of foam on lightning forest fires has increased substantially. A concerted effort is needed by all agencies across Canada to provide technical transfer and research on both ground and aerial applied foam. AFS has produced an in-service training course for use by the field, plus carried out a training course for all trainers in the spring of 1991. AFS has produced an operation manual for field use.

Proposal or Recommendation: AFS in conjunction with Forestry Canada will continue to conduct ground evaluation of aerial applied foam on wildfire. Also ground applied foam will be evaluated by an AFS foam team on support action fires. Thereafter, an information package will be provided when sufficient results are obtained in the form of a user guide.

Research, Development and Technology Transfer Needs

Agency: Gcv't. of Forestry, Lands & Wildlife. Alberta Forest Service. Forest Protection.

Date: January 1992

Title or Area of Need: Prescribed fire: 1) Predicting Crown Slash Fuel Weights for White Spruce, Lodgepole Pine and Trembling Aspen in Alberta. 2) Effects of prescribed fire on forest productivity. 3) Technical transfer of Smoke Management information for operational use in Alberta. OVER....

Priority: (Check One)

High ☐ **Medium** ☒ **Low** ☐

Background: Study Goals:

a) To develop predicitive equations which will estimate crown slash fuel by weight, prior to logging, thinning or other disturbances.

b) To develop predictive equation which will estimate the proportions of foliage in live and dead crown components.

c) To develop predictive equations which will estimate the fuel weights by branchwood diameter size classes, as outlined by Van Wagner (1982).

Proposal or Recommendation: Joint venture between AFS and Forestry Canada.

continued...

Title or Area of Need:

4) A study of winter foliar moisture so as to apply this to expected fire behaviour and results expected from winter alpine burning in mountainous areas during chinook conditions.

5) Further studies in post burn effects, primarily in Silviculture and Habitat Enhancement Burns.

Research, Development and Technology Transfer Needs

Agency: Gov't of Forestry, Lands & Wildlife. Alberta Forest Service. Forest Protection.

Date: January 1992

Title or Area of Need: Next Generation Large Airtankers

Priority: **(Check One)**

High ☐ **Medium** ☒ **Low** ☐

Background: What is available on the market to replace the DC-6 airtanker? What is its life expectancy? What are the expected costs of piston aircraft, turbine aircraft in the same gallonage capacity?

Proposal or Recommendation: Recommend researching market as to new or used aircraft being converted to airtankers and their cost benefit relationship to present fleet.

Research, Development and Technology Transfer Needs

Agency: Gov't. of Forestry, Lands & Wildlife. Alberta Forest Service. Forest Protection.

Date: January 1992

Title or Area of Need: Intelligent Fire Management Information System

Priority: **(Check One)**

High ☐ **Medium** ☒ **Low** ☐

Background: Through a co-operative effort between Forestry Canada and the Alberta Forest Service, a computer program based on Fire Management Information System has been developed including a Presuppression Preparedness module. The system however, is designed to allow the addition of other applications which are fire management related.

Proposal or Recommendation: The additional applications be developed for operatioal use such as:

1. Prescribed burn application
2. Fire risk classification/identification
3. Automatic vehicle location
4. Insects & Disease trapping/modelling

BRITISH COLUMBIA

BRITISH COLUMBIA

EXCHANGE OF INFORMATION - 1991

General Fire Situation and Statistics for 1991

The number of wildfires in B.C. in 1991 was less than usual: at 2 023, compared to the annual average of 2 879 for the five-year period from 1986 to 1990. The area burned is estimated at 30 912 hectares, which is slightly less than the previous five-year annual average of 32 980 hectares.

Frequent and widespread precipitation delayed the arrival of the 1991 wildfire season by a couple of months. Lightning activity in the northern half of the province in August triggered an outbreak of fires. Three provincial fire Overhead Teams, three mobile fire camps, ten Unit Crews, one Fire Administration Service (FAST) Team, and one Fire Information Service (FIST) Team leader were dispatched there, along with key fireline personnel.

The southern half of the province experienced a drying trend which began in September and lasted until late October. Key initial attack resources, from helitack crews to airtankers, were extended to provide fire suppression capability. A severe windstorm in mid-October resulted in downed powerlines and numerous fires in the south-east part of the province.

The largest fire of 1991 was lightning-caused and burned 6 370 hectares in the Cassiar Forest District. The next-largest was also ignited by lightning and burned 2 500 hectares in the Mackenzie Forest District.

Of the five largest fires, four were lightning-caused and burned a total of 12 782 hectares. The fourth-largest was the result of a hangover fire from land clearing. It burned 1 075 hectares in the Fort St. John Forest District.

Unit Crews provided 103 776 person-hours of work on 64 fires in 1991. Five Category I Unit Crews were operational: three were operated by the Ministry, one jointly with the British Columbia Forestry Association, and one was hired under contract.

Certification of crews required successful completion of a rigorous training program which assesses fitness and endurance. The training provides knowledge of fireline safety, fireline construction, mop-up techniques, helicopter safety and first aid. These crews are equipped to be self-sufficient for up to 72 hours while on the fireline.

One Category II Unit Crew exists and is composed of regular Ministry of Forests employees at the headquarters level. It was not used in 1991 due to the moderate fire load.

Thirteen Category III Unit Crews were certified. These are pre-organized, trained crews which are hired when needed. Of the thirteen, ten crews are composed of natives hired under the Natives Initiatives Program. The three remaining crews are hired on a casual basis, and some also contain natives. Certification of these crews was carried out with a three-day training session which included physical fitness and work performance testing.

The Ministry had 12 Rapattack crews consisting of three men each. They actioned a total of 94 targets, 68 from the south-central main base at Salmon Arm and 26 from the northern satellite base at McBride. Average fire costs were $2,221.

No contracted Rapattack crews were used in 1991, having been replaced by Forest Service personnel. All Rapattack crews are mobile both within the province, and to other jurisdictions when needed.

A total of 25 helipads were constructed in five forest districts for inventory, engineering and forest health activities. Demonstrations of helicopter rappelling were carried out at public events throughout the province.

Through CIFFC, B.C. fire fighting resources were dispatched out of the province. Four Unit Crews assisted in the Yukon Territory and ten three-person helitack crews went to Ontario. No fire fighting resources were requested to assist with fire suppression in the Pacific Northwest states, but fire weather and behaviour information were supplied in response to a request from BIFFC to CIFFC.

The fire statistics are as follows:

Forest Region	**Number of fires**	**Area burned (ha)**
Vancouver	225	299
Prince Rupert	220	8 879
Prince George	424	18 716
Kamloops	523	1 386
Nelson	421	1 197
Cariboo	210	435
Total	**2 023**	**30 912**

Aircraft Utilisation

British Columbia's fleet of 16 contracted air tankers actioned a total of 235 fires (about 11% of the total number) during 1991. Three light and six medium helicopters were contracted for fire control operations.

Approximately 17 160 flight hours for both fixed- and rotary-winged aircraft were flown in support of fire suppression activities during the season.

ANNUAL 91/92

1. FIXED WING

Aircraft Type	No.	Hours Bombing		Litres Dropped Retardant/Water
Firecat	12	873	Contract	2 038 853 Ret.
Douglas DC-6	5	426	Contract	3 058 781 Ret.
A26	6	10	Casual	29 056 Ret.

Subtotal Hours 1,309 Litres 5 126 690 Long Term

2. ROTARY WING

Aircraft Type	No.	Hours Bombing + Bucketting	Hire
Bell 204B	4	51	Casual
204C	2	20	Casual
Bell 205	11	196	6 X Contract + Casual
206A	1	1	Casual
206B	80	338	Contract + Casual
206L1	3	6	Contract + Casual
206L3	2	11	Casual
212	9	76	Casual
300	1	1	Casual
350B	8	50	Casual
355F1	1	2	Casual
500C	1	1	Casual
500D	9	35	Casual
S61	1	2	Casual

Subtotal Hours 788

TOTAL HOURS FLOWN			TOTAL LITRES
Fixed Wing	1 309.0	Long Term	5 126 690
Rotary Wing	788.0		
GRAND TOTAL	2 097.0		5 126 690

Equipment Development and Testing

Draft procedures for equipment development have been completed. A questionnaire for field staff is being developed to identify equipment development needs and help set provincial priorities.

Floor plans for a new prototype 100-person mobile firecamp are being completed. If construction goes as planned the camp should be ready for use sometime during the 1992 fire season.

The equipment section has recently completed development of several new items. These are available from the provincial warehouses and include a mini-light holder for safety caps, a portable winder for 5/8"or 3/4"hose, a fallers' pouch, a belt weather station kit, a Unit Crew equipment harness, a 5/8" gravity funnel and modified Nomex coveralls.

The retaining clip on the hose winder has been strengthened and we are looking at the viability of adding a reflective strip to the Nomex coveralls. Changes to the fallers' pouch and the belt weather station are being planned.

Other items at various stages of development include an attachment which converts a "fog" nozzle into a foam nozzle, modifications to the portable helipads, a rappel rope anchor and plastic fire hose fittings. Protection Branch is also co-ordinating testing and evaluation of several products to determine if they are suitable for fire suppression. The latest are Bouton rubber goggles and the H2 Hoe.

Fire Prevention Activities

"Smokey Bear" continues to be an active participant in the province's fire prevention program. The media continue to be used to spread the fire prevention message, especially during the peak fire danger periods.

The Arson Award Program provides another tool to combat the incendiary fire problem.

Training

Protection Branch worked on the following courses:

Basic Fireline Timekeeping (S-260) was revised and updated.

Fireline Finance and Administration (S-360) was developed. It deals with financial and administrative objectives and restraints and results with respect to fireline finance and senior fireline administration personnel.

Helicopter Use (S-270) was developed as an introduction, with emphases on fire applications and safety.

Helipad Construction (S-271) is new and covers the safe and efficient construction and placement of helipads.

Helicopter Management (S-370) was revised. It enables senior fireline personnel to safely and effectively use helicopters on the fireline.

All of these courses will be released in the Spring of 1992.

Other major training initiatives include:
- an Edukit training package on Wildland Basics for Structural Fire Fighters,
- a major updating of the Fireline Certification criteria: experience, training, ability and physical fitness,
- continuing Rapattack training,
- expanded initial attack training standards, and
- expanded training for the Native Unit Crew Program.

Prescribed Burning

The use of prescribed fire continues to support silvicultural site preparation, wildlife habitat enhancement, range management and hazard reduction.

Statistics for prescribed burning during 1991 are as follows:

	Area Burned (ha)					
Region	Silv.	Hazard	Range	Wildlife	Other*	Total
Vancouver	1 591	282			47	1 920
P. Rupert	4 677			5 400	2 948	13 025
P. George	7 961		20 970	54 474	3 543	86 948
Kamloops	4 467			12	3 304	7 783
Nelson	4 416	998	1 065	732	66	7 277
Cariboo	4 687	35	1 010	200		5 932
Total	**27 799**	**1 315**	**23 045**	**60 818**	**9 908**	**122 885**

*Includes spot burn, bunch and burn, and windrow burn.

Research and Development Projects

The major research and development projects carried out by Protection Branch are described in the attached reports.

In addition, the Fire Ecology Research and Extension (FiRE) Program provides co-ordination between the protection and research programs. Representatives from Protection and Research branches as well as the regional Forest Sciences sections communicate regarding ongoing fire research, research needs.

Linkages exist with other resource management concerns such as reforestation, vegetation succession and competition, site productivity, tree growth, forest health, air quality, wildlife habitat requirements, biodiversity, and old growth preservation.

CCFFM MEMBER RESEARCH, DEVELOPMENT, AND TECHNOLOGY TRANSFER INITIATION, STATUS, OR COMPLETION REPORT

AGENCY DATE January 1992

B.C. Forest Service, Protection Branch PROJECT NO.: BC-1

Forest Protection and Fire Suppression Computer Services

KEY WORDS: information systems, data processing, computer terminals

CURRENT YEAR RESOURCES

Person-Years: 1.5 Funding ($000): 1,900.5

TIMETABLE

Starting date: 1973 Est. Completion Date: continuous

OBJECTIVE

To develop, implement, and manage the fire management and air operations information system functions which assist the regions and districts in the performance of operational and planning functions.

WORK DONE

All forest regions and districts, plus some field offices, are on line to the Protection Information System. This distributed network gives users access to the computerised information systems and databases as well as applications such as electronic messaging and word processing. A number of forest companies, provincial and national parks and private firms are also linked to the system.

REPORTS AND OTHER DATA AVAILABLE

Ministry of Forests. 1991. Operational fire systems manual. 279 p.

Ministry of Forests. 1991. Administrative fire systems manual. 228 p.

PROJECT LEADER P. Fuglem YEAR: 1991-92

CCFFM MEMBER RESEARCH, DEVELOPMENT, AND TECHNOLOGY TRANSFER INITIATION, STATUS, OR COMPLETION REPORT

AGENCY DATE January 1992

B.C. Forest Service, Protection Branch PROJECT NO.: BC-2

Advanced Fire Management System

KEY WORDS: information systems, fire management, computer terminals, fire management, computer graphics

CURRENT YEAR RESOURCES

Person-Years: 0.08 Funding ($000): 100.0

TIMETABLE

Starting date: 1987 Est. Completion Date: continuous

OBJECTIVE

To maintain and enhance the AFMS fire management decision support tools for the fire control officers utilising software developed by the Petawawa National Forestry Institute and modified by the Maniwaki Technology Transfer Centre.

WORK DONE

The system is operational in the provincial headquarters, all six regional offices, air operations centres, and all forest districts during the fire season. The system involves centralised data collection and modelling processes on a VAX computer cluster in Victoria. Via network distribution and graphics generation, the information is displayed on local IBM PS/2 personal computers. Enhancements continue to be implemented.

REPORTS AND OTHER DATA AVAILABLE

Fuglem, P. and S. Grimaldi. 1988. British Columbia Forest Service Advanced Fire Management System. In Proc. Northwest Fire Council 1988 Annual Meeting, Sidney, B.C. pp. 101 - 107.

PROJECT LEADER P. Fuglem YEAR: 1991-92

CCFFM MEMBER RESEARCH, DEVELOPMENT, AND TECHNOLOGY TRANSFER
INITIATION, STATUS, OR COMPLETION REPORT

AGENCY DATE January 1992

B.C. Forest Service, Protection Branch PROJECT NO.: BC-3

Lightning Location System

KEY WORDS: lightning detection, fire detection, computers

CURRENT YEAR RESOURCES

Person-Years: 0.33 Funding ($000): 225.0

TIMETABLE

Starting date: 1979 Est. Completion Date: continuous

OBJECTIVE

To provide timely and reliable information to forest regions and districts as well as outside agencies on the occurrence and distribution of lightning.

WORK DONE

The lightning location system consists of 26 direction finders communicating with a position analyser in Victoria. All but four are Advanced Lightning Direction Finders. A computer link transfers the lightning location data to all Protection Information System users.

More high resolution clocks were installed this year and the remaining ones will be converted in 1992. Data acquired from the LPATS lightning location system installed in the Pacific Northwest states have been compared with the existing LLS system. Further evaluation work will be done during the 1992 season.

REPORTS AND OTHER DATA AVAILABLE

Advanced Position Analyzer Operating and Service Manual. 1988.

Advanced Lightning Direction Finder Manual. 1987.

A Statistical Analysis of B.C.'s Lightning System. 1986.

PROJECT LEADER M. Winder YEAR: 1991-92

CCFFM MEMBER RESEARCH, DEVELOPMENT, AND TECHNOLOGY TRANSFER INITIATION, STATUS, OR COMPLETION REPORT

AGENCY DATE January 1992

B.C. Forest Service, Protection Branch PROJECT NO.: BC-4

Habitat Monitoring Guidelines

KEY WORDS: fire ecology, prescribed fire effects, fire monitoring

CURRENT YEAR RESOURCES

Person-Years: 0.06 Funding ($000): 17.6

TIMETABLE

Starting date: 1986 Est. Completion Date: continuous

OBJECTIVE

To standardise procedures for the documentation and sampling of pre-treatment conditions, the treatment activity, and the response of the site and vegetation. Treatments include prescribed fire, stand management, grazing, herbicide application, seeding and planting, tillage and scarification, fertiliser application, and water level manipulation.

WORK DONE

The fourth draft of the manual was issued in 1991, along with field forms. The computer database for data storage, analysis, and report generation was made operational. Training of staff in field data collection procedures and computer entry and analysis was carried out.

REPORTS AND OTHER DATA AVAILABLE

Habitat Monitoring Committee. 1990. Procedures for environmental monitoring in range and wildlife habitat management. Draft version 4.0. British Columbia Ministry of Environment and the British Columbia Ministry of Forests, Victoria, B.C. xvii + 143 p.

BRANCH PROJECT LEADER J. Parminter YEAR: 1991-92

CCFFM MEMBER RESEARCH, DEVELOPMENT, AND TECHNOLOGY TRANSFER INITIATION, STATUS, OR COMPLETION REPORT

AGENCY

DATE January 1992

B.C. Forest Service, Protection Branch

PROJECT NO.: BC-5

Provincial Remote Automated Fire Weather Network

KEY WORDS: remote automated fire weather stations, weather data, computers

CURRENT YEAR RESOURCES

Person-Years: 0.55

Funding ($000): 927.0

TIMETABLE

Starting date: 1987

Est. Completion Date: 1992

OBJECTIVE

To provide timely and reliable information to forest districts, forest regions, and outside agencies on local fire weather conditions through the development, operation, and maintenance of the Provincial Fire Weather Network.

WORK DONE

Up to 70 network clusters are currently controlling about 140 weather stations. Upgrading of weather stations to the network clusters continues. The vendor, Forest Technology Systems, operated a technical support service during the fire season.

The new FWS11 data logger was tested at two separate clusters, along with new access software. New temperature, humidity, and wind sensing instruments were evaluated. The raingauge's tipping mechanism was redesigned.

REPORTS AND OTHER DATA AVAILABLE

Grimaldi, S.K. 1987. Provincial Fire Weather Network - Five Year Development Plan. MOFL, Protection Branch.

PROJECT LEADERS E. Meyer, P. Taudin-Chabot

YEAR: 1991-92

CCFFM MEMBER RESEARCH, DEVELOPMENT, AND TECHNOLOGY TRANSFER INITIATION, STATUS, OR COMPLETION REPORT

AGENCY DATE January 1992

B.C. Forest Service, Protection Branch PROJECT NO.: BC-6

Smoke Plume Evaluation and Monitoring Project

KEY WORDS: prescribed fire, smoke dispersal, computer modelling

CURRENT YEAR RESOURCES

Person-Years: 0.40 Funding ($000): 200.0

TIMETABLE

Starting date: 1989 Est. Completion Date: continuous

OBJECTIVE

To develop operational tools and policies to minimise the impact of prescribed fire smoke, particularly as measured and modelled as visibility impact.

WORK DONE

Operational prescribed burns in the central interior were monitored for fuel loading and consumption, fire behaviour, smoke emission characteristics, and smoke plume dispersal.

Development and operational testing of a provincial meso-scale wind and smoke transport model continued. A SUN workstation is being used to decrease processing costs on the VAX network cluster.

REPORTS AND OTHER DATA AVAILABLE

Fuglem, P.L. and M. Danard. 1990. Weather modeling for wildfire behavior and smoke management. Proc. 11th Conf. on Fire and Forest Met. April 16-19, Missoula, MT.

Danard, M. et al. 1991. Verifying and improving the B.C. Ministry of Forests provincial prognostic mesoscale model (summer 1991). Atmospheric Dynamics Corporation Publication.

PROJECT LEADER P. Fuglem YEAR: 1991-92

CCFFM MEMBER RESEARCH, DEVELOPMENT, AND TECHNOLOGY TRANSFER INITIATION, STATUS, OR COMPLETION REPORT

AGENCY

DATE January 1990

B.C. Forest Service, Protection Branch

PROJECT NO.: BC-7

Fire Occurrence Prediction

KEY WORDS:

fire occurrence, computer modeling

CURRENT YEAR RESOURCES

Person-Years: 0.20

Funding ($000): $15

TIMETABLE

Starting date: 1978

Est. Completion Date: continuous

OBJECTIVE

To develop and implement state-of-the-art geographic fire occurrence prediction systems. Current systems involve statistical and process models of man- and lightning-caused fire occurrence.

WORK DONE

Models developed by PNFI have been implemented and tested for three fire seasons. Man-caused prediction has been working acceptably for current needs. Lightning fire prediction provides good overall predictions (provincial levels) but requires work in calibration for B.C. fuel types to allow better local prediction.

REPORTS AND OTHER DATA AVAILABLE

PROJECT LEADER P. Fuglem

YEAR: 1991-92

CCFFM MEMBER RESEARCH, DEVELOPMENT, AND TECHNOLOGY TRANSFER NEEDS

AGENCY

DATE January 1992

B.C. Forest Service, Protection Branch

TITLE OR AREA OF NEED

Fire Behaviour Prediction

PRIORITY (check one)

High ___X___ Medium ______ Low ______

BACKGROUND

The current Fire Behaviour Prediction system of the CFFDRS adequately covers the major species and terrain conditions for most of Canada. Only 50-60% of the complex mix of forest and non-forest cover and terrain of British Columbia is represented. Similar problems exist for the Yukon, Alberta and the mountain National Parks.

In addition, fire growth modeling is constrained in these areas due to complex weather/terrain interactions. Modeling of these processes in real and forecast time periods is essential.

PROPOSAL OR RECOMMENDATION

An extensive joint study be developed with Forestry Canada, the British Columbia Forest Service, Yukon Forest Service, Alberta Forest Service and Parks Canada.

CCFFM MEMBER RESEARCH, DEVELOPMENT, AND TECHNOLOGY TRANSFER NEEDS

AGENCY

DATE January 1992

B.C. Forest Service, Protection Branch

TITLE OR AREA OF NEED

Fire Occurrence Prediction

PRIORITY (check one)

High ___X___ Medium ______ Low ______

BACKGROUND

The British Columbia Forest Service and most other agencies have a need to develop and implement state-of-the-art geographic fire occurrence prediction systems. Current systems involve statistical and process models of man- and lightning-caused fire occurrence.

In the era of mobile fire control resources, these systems are essential to conducting future fire prevention and control operations in a cost-effective manner.

PROPOSAL OR RECOMMENDATION

That the initiative to establish a workshop on FOP be supported and a national task group be developed.

CCFFM MEMBER RESEARCH, DEVELOPMENT, AND TECHNOLOGY TRANSFER NEEDS

AGENCY DATE January 1992

B.C. Forest Service, Protection Branch

TITLE OR AREA OF NEED

Prescribed Burn Planning and Execution

PRIORITY (check one)

High ___X___ Medium ______ Low ______

BACKGROUND

Prescribed burning will remain a viable silvicultural site preparation treatment. While its use may decline due to a wider variety of suitable mechanical alternatives and environmental concerns in smoke-sensitive areas, it will continue to be used.

PROPOSAL OR RECOMMENDATION

Prescribed burning techniques need to be continually improved. New methods, equipment, and specific uses for prescribed burning will evolve. Communication and co-operation between the major users of prescribed fire must continue.

Assessment of risks associated with prescribed burning also deserves attention, as is done for wildfire.

CCFFM MEMBER RESEARCH, DEVELOPMENT, AND TECHNOLOGY TRANSFER NEEDS

AGENCY

DATE January 1992

B.C. Forest Service, Protection Branch

TITLE OR AREA OF NEED

Smoke Management

PRIORITY (check one)

High ___X___ Medium ______ Low ______

BACKGROUND

While concern for smoke management has existed for more than two decades, research in this area has grown dramatically and assumed greater proportions in the past few years. If prescribed fire is to be used effectively, smoke management becomes a major item.

PROPOSAL OR RECOMMENDATION

Work must continue in North America on emissions and smoke plume transport modeling. Co-operative research efforts between Forestry Canada, Ontario, British Columbia, and various U.S. agencies and universities has yielded much of benefit.

CCFFM MEMBER RESEARCH, DEVELOPMENT, AND TECHNOLOGY TRANSFER NEEDS

AGENCY DATE January 1992

B.C. Forest Service, Protection Branch

TITLE OR AREA OF NEED

Socio-economic Aspects of Fire

PRIORITY (check one)

High ___X___ Medium ______ Low ______

BACKGROUND

Forest fires cause millions of dollars worth of damage each year while control costs in Canada exceed $500 million. It is important that fire management and its contribution to the national and local economies be measured and that means to ensure maximum benefit be evaluated.

PROPOSAL OR RECOMMENDATION

That a task group be established to review and develop strategies, mechanisms and standards for evaluating the impact of wildfires, and the contribution of fire management efforts in reducing these impacts.

It is essential to communicate the results of these evaluations to the public as well as the policy and budgeting levels of governments.

CCFFM MEMBER RESEARCH, DEVELOPMENT, AND TECHNOLOGY TRANSFER NEEDS

AGENCY

DATE January 1992

B.C. Forest Service, Protection Branch

TITLE OR AREA OF NEED

Fire Control Strategies in the Wildland-Urban Interface Zone

PRIORITY (check one)

High ___X___ Medium ______ Low ______

BACKGROUND

In British Columbia alone the value of developments in the wildland-urban interface zone approaches $15.0 billion. The potential for loss of life and property in the wildland-urban interface zone varies locally but will be integral in determining wildland fire-fighting priorities.

PROPOSAL OR RECOMMENDATION

Because of the special nature of the fire environment represented by a mix of forest fuels and structures, as well as the possibility of having both wildland and urban fire-fighting crews present, the interface zone is a complex one. Research will be required to determine the special nature of fire behaviour and optimal fire suppression strategies.

NORTHWEST TERRITORIES

EXCHANGE OF INFORMATION
NORTHWEST TERRITORIES
1991

1. General Fire Situation

The 1991 Fire Season in Northwest Territories can best be described as an average season with a total of 331 fires reported; 239 of which received some measure of suppression activity. The area southeast of Great Slave Lake, north of Saskatchewan and Manitoba known as the Caribou Range recorded 123 fire starts or nearly 40% of Northwest Territories' total. Of the 225,469.82 hectares burned in Northwest Territories, 201,886.00 hectares were in the least protected area such as the Caribou Range. Lightning activity accounted for 86% of the starts this year.

A total of 583 Extra Fire Fighters were employed at a cost of $510,000.00 to the department.

With no definitive Fire Action Zones in place, community consultation continues to play an important role in determining fire suppression activities on fires located in isolated areas.

2. Aircraft Utilization

Two groups of 2 CL-215 Airtankers with a PA-600 Birddog and one DC-6 with a PA-600 Birddog were on contract to the Department.

Helicopters under contract included: 5-B206L's, 1-AS350B, 2-B212's and 4-B205A's. (See Table 2)

3. Research, Development and Testing

The fire weather data transmission system was automated by installing custom communication software and commercial fire weather software (WXPLUS) on computers located at district and headquarters offices. The new system replaced the costly transmission of data by facsimile and reduced data input time, especially at the Territorial Forest Fire Centre.

4. Fire Prevention

A total of 36 fires or 11% of the 331 reported forest fires were suspected people fires in 1991. This is below the 20 to 30% yearly average. No specific prevention effort can account for this decrease, as the prevention campaign remained the same as in past years both in intensity and target groups.

5. Training

During the past calendar year 170 persons were trained in basic fire management skills, including firefighter, crewboss, service, and support training. 192 persons were certified or recertified under the department's Fireline Organization Certification Program. At present, the department has 1135 individuals certified; 272 of which will require retraining and/or recertification in 1992.

The department organized and delivered 13 programs to approximately 157 individuals in areas such as fie management skills refreshment, handling of dangerous goods, fireline safety, basic fire behaviour, and other health and safety programs. Departmental staff attended 5 outside agency fire programs. Departmental staff attended 5 outside agency fire management programs; Fire and Resource Management in Marana (5), Prescribed Burning in Hinton (2), and Sector Level Fire Suppression (2) in Hinton, FBP Tech Transfer Workshops in Hinton (3), and Air Attack Officer Training in Kamloops (1).

The department is involved in the development of the multiagency training programs initiated by the Hinton Forest Technology School, through assistance of training staff, and the proposed supply of technical expertise at a training course in March.

Departmental staff continue to participate in in-service training programs such as finance, management skills, administration, and computer technology, as part of the department's ongoing staff development efforts.

6. Prescribed Burning

Approximately 1000 hectares of grassland, located in the Slave River Lowlands, were burned in May. The objective of the burn was to increase the quality and quantity of forage for bison. Preliminary analysis of the post-burn vegetation shows that the burn objects have been met.

7. Publications, Films and Video Tapes

Lanoville, R.A. and Mallinson, P. 1991. Lower Mackenzie River Valley fires of June, 1986. In Proceedings of the 11th Conference on Fire and Forest Meteorology (April 16 - 19, 1991). Soc. of Am. For., Bethesda, Maryland.

Lanoville, R.A. 1991. The impact of global warming on forest fire management policy in the Northwest Territories, Canada. In Extended Abstracts (p.47). Third International Symposium on Cold Region Development (June 16-19, 1991), Alberta Research Council, Edmonton, Alberta.

8. Organizational Changes

No new organizational changes occurred in 1991.

9. Other Items of Interest

NT acquired a second CL-215 group this year through a significant cooperative effort by Transport Canada and Indian Affairs and Northern Development, Canada. This tanker group was originally based in Yukon Territory.

10. Research Needs Reports

AGENCY: Department of Renewable Resources
Government of the Northwest Territories

TITLE OR AREA OF NEED: Fire Operations

PRIORITY: High

BACKGROUND:

Fire Operations research is a perennial requirement to support the fire control efforts of the department and for this reason its priority is ranked high. The department has been active in supporting this type of research: Porter Lake Project, fire foam application and delivery, laser disk technology, and satellite imagery applications. And, it is the department's desire to continue to initiate and support this type of research.

PROPOSAL OR RECOMMENDATION

The continuance of research and development aimed at improving fire preparedness, fire fighting effectiveness, training of fire line personal, and detection is needed. Specifically,

1. Development of equipment such as infrared scanners, helitorches, mapping device and techniques (including satellite imagery applications), and application and delivery of suppressants and surfactants (both aerially and from the ground), and;

2. Fireline productivity studies to determine appropriate combinations of men and equipment for a wide range of fire environmental conditions to effect more successful initial attacks or improve fire control techniques on larger fires, and;

3. The application of new technologies to training and technology transfer such as the laser disk system for fire behaviour training, and;

4. Determination of atmospheric (lightning occurrence) and other factors (forest fuel conditions, and people/forest relationships) which affect fire arrivals or fire spread for the purpose of improving fire preparedness planning techniques.

TITLE OR AREA OF NEED: Integrated Fire Management Systems

PRIORITY: High

BACKGROUND:

The department is in the process of developing a plan whose objective is to develop a short and long term strategy for the utilization of automated systems to assist the Territorial Forest Fire Centre in its daily operations, specifically in the areas of:

> Providing timely and appropriate information to the Territorial Duty Officer for the acquisition and dispatching of fire fighting resources during the fire season.
>
> Providing information which can be used in planning the staging of fire fighting resources in advance of potentially critical situations.
>
> Providing information which can assist in the follow up reporting and analysis of fire situations.
>
> Linking the main and district offices for the effective sharing of information which is current, complete and accurate.
>
> Providing an environment where data redundancy is controlled to assist in ensuring its accuracy and correctness.
>
> Providing timely and accurate summary information to assist senior management in making decisions as they relate to the mandate of the Centre.

PROPOSAL OR RECOMMENDATION

In the development of a computer-driven fire management system for the Northwest Territories, continued research, some of it specific to the north, is needed in the following areas: fire danger rating system, fire weather analysis (includes lightning occurrence and severe fire weather phenomena), forest fuels condition, optimizing techniques applied to presuppression infrastructure (location of camps, fuel caches etc.), and values-at-risk determinations.

TITLE OR AREA OF NEED: Fire Ecology/Fire Effects

PRIORITY: High

BACKGROUND:

About one eighth of Canada's forest land is located in the Northwest Territories. Most of this forest land is of no commercial value to the forest industry. The land does, however, support large populations of animals, all of which are important to the economy: as a source of cash income, as a source of food, or as a source of recreational opportunities. In the face of the shrinking forests of the world, the forests of northern Canada represent a valuable global resource well worth managing to its fullest potential.

PROPOSAL OR RECOMMENDATION

There are three areas of research which are needed to improve the overall management of the forest lands of the Northwest Territories:

> Research is needed in fire effects on wildlife populations and in the use of fire (prescribed fire) in managing wildlife habitats.
>
> Research is needed to determine the effects of fire in permafrost areas, particularly on slopes, where changes in the forest floor mantel because of fire could initiate wide-scale slumping. This fire effect could seriously compromise industrial installations such as buried pipelines.
>
> Research is needed in the area of "economics of the whole forest" to determine how and to what extent natural changes (i.e., fire, insects, diseases, weather) and man-made changes (i.e., pollution, depletion, and consumption) affects the net flow of values northerners can expect from their forested lands.

AGENCY: Department of Renewable Resources, GNWT
University of British Columbia

TITLE: Implications of Climatic Change for Renewable Resources, Fire Operations

KEY WORKS: Climatic change, greenhouse effect, Fire Weather Index

CURRENT YEAR RESOURCES: Person Years...none; Funding $13,000.00

TIMETABLE: Start May, 1991 Completion March, 1992

OBJECTIVES:

1. To determine the climatic variables and conditions most closely associated with forest fire incidence and spread.
2. To determine the efficiency of operation of the current FWI.
3. To determine the variability of forest fires and the FWI in the 1980's, i.e. during 10 years of one times carbon dioxide climate.
4. To compute the FWI for 10 years of General Circulation Model (GCM), one times carbon dioxide climate, and compare these results with (3) above.
5. To examine the differences between FWI series computed from GCM one and two thirds carbon dioxide put, to indicate the magnitude of change in climatic conditions conductive to forest fires suggested by the simulations.

WORK DONE:

The following work has been completed: a preliminary literature review; collection of fire records and data entry into Dbase files; collection of climate data; and the integration of fire records into the Northwest Territories GIS fire atlas.

REPORTS AND OTHER WORK DONE:

A preliminary report was presented to fire managers in early December, 1991.

PROJECT LEADER: Chris Burn (Principal Investigator)

AGENCY: Department of Renewable Resources, GNWT

TITLE: The Recovery of Fur Bearers and Moose Populations After Forest Fires.

KEY WORDS: Forest fires, moose, fur bearers

CURRENT YEAR RESOURCES: Person Years...1.0; Funding: None

TIME TABLE: Start May, 1991; Completion December, 1995

OBJECTIVES:

1. Forests will regenerate as a monoculture directly back to the previous climax species i.e. black spruce.
2. Small mammals (voles and mice) will recover within the first two years depending upon the state of the population cycle surrounding the burn.
3. Snowshoe hares will require 10-20 years to recover depending upon the state of their 10 year population cycle at the time of the burn.
4. Lynx populations will not recover until the hares have recovered, but will be present 15-20 years.
5. Marten will recover shortly after the small mammals recover, if there are sufficient fallen logs to act as ground cover.
6. Moose populations will respond quickly (3-5 years) and reach higher densities then were present before the fire.

WORK DONE:

This year was a year to test field techniques and to organize the manpower support for the project. Field testing has occurred with further analysis of results to take place during the winter.

REPORTS AND OTHER WORK DONE: None to date.

PROJECT LEADER: Ron Graf

AGENCY: Department of Renewable Resources, GNWT

TITLE: Forest Burns in the Sahtu District and Their Importance to Economically Important Wildlife

KEY WORDS: Forest fires, wildlife

CURRENT YEAR RESOURCES: Person Years...1; Funding: None

TIME TABLE: Start April, 1991; Completion December, 1993

OBJECTIVE:

To describe the floral and faunal characteristics of a variety of known age burns.

WORK DONE:

Five potential study burns were identified and remote sensing was obtained. For most of the burns, the classification units identified on the imagery appeared to represent distinct vegetation associations in the burns. A study design is currently being developed for the aerial track counts.

REPORTS AND OTHER WORK DONE: None to date

PROJECT LEADER: Paul Latour

AGENCY: Department of Renewable Resources, GNWT
University of Alberta

TITLE: Understanding and Resolving Conflict as it Pertains to Forest Land Base Allocation and Public Involvement

KEY WORDS: Forest management, land management, public involvement

CURRENT YEAR RESOURCES: Person years: None Funding:$15,000.00

TIME TABLE: Start September, 1991; Completion March 1993

PROJECT LEADER: Kim Clark (Principal Investigator)

AGENCY: Department of Renewable Resources, GNWT
Forestry Canada

TITLE: Fire History Study of Fort Providence Management Area

KEY WORDS: Fire history, fire management

CURRENT YEAR RESOURCES: Person Years: 1; Funding: variable

TIME TABLE: Start April 1991; Completion April, 1994

OBJECTIVE:

The fire history study is to provide baseline information on fire cycle, fire frequency, type and extent of fires, and a description of fire regime(s) for an area defined by the Fort Providence Management Plan, 40,000 square kilometre land area containing the Mackenzie Bison Sanctuary north of Fort Providence. This baseline data will be used to support a strategy of using both wildfire and prescribed fire to achieve land management objectives in the management area.

WORK DONE: Completion of one season's field work

REPORTS AND OTHER WORK DONE: None to date

PROJECT LEADER: Bill DeGroot (Principal Investigator)

FIRES BY CAUSE AND AREA BURNED

1991 NT

CAUSE	NO. OF FIRES	AREA BURNED
Recreation	20	12.57 Ha
Resident	16	12.83 Ha
Forest Industry	--	----
Railroad	--	----
Other Industry	1	2.00 Ha
Incendiary	--	----
Unknown	10	223.59 Ha
Sub Total	48	251.29 Ha
Lightning	284	225,218.83 Ha
Total	331	225,469.82 Ha

FIRES BY MONTH AND AREA BURNED

1991 NT

	MAY	JUNE	JULY	AUG.	SEPT	TOTAL
Caribou Range	- -	21 11,549.11	48 113,239.62	54 77,097.27	- -	123 201,886.00
Fort Smith	- -	3 2,80	6 2.42	14 18.78	- -	23 24.00
Hay River	1 0.10	1 0.05	2 0.70	4 8.80	- -	8 9.65
Yellowknife	1 0.01	8 5.12	27 8,199.55	25 71.69	- -	61 8,276.37
Inuvik	- -	1 0.01	9 353.02	4 10.03	- -	14 363.06
Norman Wells	- -	2 0.22	27 11,099.78	3 504.00	- -	32 11,604.00
Fort Liard	- -	8 645.11	- -	1 1.50	- -	9 646.61
Fort Simpson	3 7.50	15 1,933.36	30 694.39	12 24.13	1 0.75	61 2,660.13
TOTALS	5 7.61	59 14,135.78	149 133,589.48	117 77,736.20	1 0.75	331 225,469.82

FIRES AND AREA BURNED

BY SIZE CLASS

1991 NT

Up to 0.1 Ha	79 Fires	7.48
.11 to 1 Ha	86 Fires	48.38
1.10 to 100 Ha	83 Fires	328.80
10.10 to 100 Ha	41 Fires	1,777.50
100.10 to 1,000 Ha	23 Fires	11,074.66
1,000.10 to 10,000 Ha	11 Fires	54,136.00
10,000.10 to 100,000 Ha	8 Fires	158,097.00
	331 Fires	225,469.82

FIRES BY SUB-DISTRICT AND AREA BURNED

NT 1990

	ACTIONED	NO ACTION	TOTALS
Caribou Range	69 1,131.00	54 200,755.00	123 201,886.00
Fort Smith	22 22.56	1 1.50	23 24.00
Hay River	8 9.65	- -	8 9.65
Yellowknife	57 126.36	4 8,150.01	61 8,276.37
Inuvik	8 350.52	6 12.54	14 363.06
Norman Wells	22 554.79	10 11,049.21	32 11,604.00
Fort Liard	3 471.50	6 175.11	9 646.61
Fort Simpson	50 736.09	11 1,924.04	61 2,660.13
TOTALS	239 3,402.41	92 222,067.41	331 225,469.82

AIRCRAFT UTILIZATION

1991 NT

1. Fixed Wing

Aircraft Type	No.		Hours Bombing		Litres Dropped Ret/Foam/Water
DC-6	1	Contract	45.4		
	3	Casual	72.0	Total	995,063
CL-215	4	Contract	533.8		
	4	Casual	41.2	Total	10,965,167

Sub Total	12	692.4	10,485,684 Foam
			995,063 L/T
			480,000 Water
		TOTAL	11,960,747 Litres

2. Rotary Wing

Aircraft Type	No.	Hours Bombing Contract & Casual	Litres Dropped Ret/Foam/Water
Astar 350B	7	52.9	375,000 Water
Astar 355F	1	2.5	17,400 Water
B 204B	7	43.9	711,000 Water
B 205A-1	7	76.0	1,413,600 Water
B 206B	13	13.0	62,400 Water
B 206L	1	44.7	268,000 Water
B 206L1	8	69.4	491,300 Water
B 206L3	1	0.2	1,400 Water
B 212	6	73.5	1,367,100 Water

Sub Total	51	376.1	**TOTAL** 4,707,200 Water

TOTAL HOURS FLOWN

Fixed Wing	692.4
Rotary Wing	376.1
Grand Total	**1,068.5**

TOTAL LITRES DROPPED

Water	5,187,200
Foam	10,485,684
Long Term	955,063
Short Term	
	16,667,947 Litres

YUKON TERRITORY

EXCHANGE OF INFORMATION - 1991
YUKON

1. General Situation.

During the '91 season we had 187 fires, approximately 20 above the yearly average. Of the 187 fires, 121 were fought; 117 in the Action Zone and 4 fought in the Observation Zone. Lightning caused 124 fires and man caused 63.

During the period from June 20 to June 30, 1991 86.5% of the burned area occurred with 98 fires. The weather patterns dissipated in early July to cooler and wetter systems. Our fire season was, for all intents and purposes, over. Some weather stations had BUI's in the single digits and FWI's of 0 for six days duration in the latter part of July and August. This contributed to the short season.

Assistance from other agencies was called for. Alberta and B.C. responded with manpower and resources for a variety of fires. Allocation of these resources was to fires that were considered a threat to communities or life and property.

2. Supplemental Resources used on Yukon Fires.

Fire number	Resources	Values at Risk
XY-32-91	B.C. - 2 Unit crews	Whitehorse suburbs
WL-15-91	Alta. O.H. team 50 Fire fighters Hose Camp & line equipment	YTG grader station, Timber, Residential property.
DA-21-91) DA-15-91) DA-30-91)	B.C. Unit crews B.C. Advisors B.C. Heli tak	Property, Life and Timber values
BC-07-91	Alaska Ground Tankers	NORAD site, Private property, U.S. Customs site.

3. Fire Information.

The first fire of the season of concern was the Lewes Lake fire. This fire started from a trash burning fire and resulted in a 60 ha area being burned. This fire burned amongst six houses which the ground crews managed to save. The fire made its initial and final run on the first day, May 14, 1991.

Prosecution of the individual in this case was successful. He was found guilty but no costs or time were assessed.

Previous to this time, April 30 to May 14, 1991, the Whitehorse District received a flurry of arson fires, twelve in all. No one person was found or charged. The arsonist(s) started fires in the Annie Lake area and worked their way East to Watson Lake District. From this point the person(s) continued South on the Deese Lake Highway into B.C. Apparently B.C. received a few arson fires during this time but no one was apprehended.

Whitehorse fire number 32, on the outskirts of Whitehorse burned 1,500 ha. There were evacuations of two urban areas. In the end the fire was contained to the mid and upper slopes of Haeckel Hill. The plan for burning the cat guard was abandoned due to a change of weather.

From June 20 to June 30, 1991, we had ninety eight (98) new starts. These new fires were in all districts throughout the Yukon. During this period we required outside assistance, which we received under MARS.

Fires in Watson Lake, Dawson, Mayo and Carmacks Districts utilized the majority of all our resources and those imported. Priorizing of fires became of utmost importance in order to ensure resource allocation was not depleted in high profile areas. Generally this resulted in a need to reassess our action zone fires based on local conditions on site. This process will be continued in the coming years.

4. Equipment and personnel loaned under the MARS Agreement.

B.C. - 4 - 20 man Unit crews
10 Other specialists
1 DC 6 group
1 Firecat group

N.W.T. - 1 Bird dog officer

Alberta - 1 Overhead team
2 - 25 man crews
20,000 feet hose
Camp kits
Sector kits
Communication kit

Alaska - 3 ground tanker trucks and crews

Additional resources included one additional A-26 to supplement our Airtanker group. Over 300 extra fire fighters were hired this season.

We did not send resources south of 60′ this season.

5. Fire Statistics.

Year	(%), Fought	(%), Not Fought	Fires
1991	(66), 123	(34), 64	187
1990	(82), 127	(18), 27	154
1989	(70), 172	(30), 72	244

Lightning fires by Month; 1991

APR	MAY	JUNE	JULY	AUGUST	
0	0	95	28	2	125

Man Caused fires by Month; 1991

APR	MAY	JUNE	JULY	AUGUST	
8	28	15	5	6	62

Man Caused 33% Lightning 67%

Three Year Average

YEAR	MAN		LIGHTNING		TOTAL
1991	62	33%	125	67%	187
1990	80	52%	74	48%	154
1989	85	35%	159	65%	244
Average	75	40%	119	60%	195

6. Equipment.

Remote weather equipment is being upgraded as utilization increases. Most Districts do have access to this equipment. Computer programs were introduced to the Districts this season with good results. We now have all Districts tied into an integrated package. There will be a change in the 1992 season in an effort to make entries on a first time basis. This should enable the field personnel to cut down on the present duplication of report requirements.

Future computerization is expected to make the programs user friendly to all field personnel. Warehousing in Districts may be considered in the next few years. Presently programs are being looked at and trials are being assessed at the Regional Depot.

7. Prevention.

Wildfire prevention campaigns were directed to school children and debris burning. These groups were addressed through all media coverage in Whitehorse and the outlying communities. School talks by District personnel were given. Advertisements were also placed in tourism brochures.

Continuation of community radio broadcasts of the daily fire hazards and special editions during high to extreme hazards during long weekends.

Smokey the Bear publications and public relations material were used during school presentations and community events. A display unit was worked on for public displays at a variety of events.

During the Whitehorse, Carmacks and Dawson fires a considerable amount of time was spent with the local media to improve relations. This process will be continued next season in order to enhance our public image. The time spent this season was quite productive.

8. Air Operations.

The CL-215's were released from the Yukon during the winter of 1990/91. Replacement by two A-26's was the major change for 1991.

Contracts for 1991

2	Patrol aircraft, Cessna 206
1	Jumpship, DC-3
2	Air Tanker groups, 4 - A-26
2	Bird dog aircraft, PA 60 Aerostar.

Rotorwing were again hired on an as and when basis. As in the past there were no problems in acquiring the numbers and types required.

9. Organizational Changes.

There have been no further discussions with Yukon Territorial Government regarding the transfer or devolving of Forest Resources. There has been some indication that perhaps the Spring of 1993 is being considered.

TABLE 01

FIRES BY PRIORITY ZONE, DISTRICT, AND AREA BURNED

1991

DISTRICT	ACTION ZONE FOUGHT	NOT FOUGHT	SUB TOTAL	OBSERVATION ZONE FOUGHT	NOT FOUGHT	SUB TOTAL	TOTAL
BEAVER CREEK	1 257.00		1 257.00		6 4,842.00	6 4,842.00	7 5,099.00
CARMACKS	11 7,880.68	1 476.60	12 8,357.28		3 75.76	3 75.76	15 8,433.04
DAWSON	16 27,625.61	13 10,107.01	29 37,732.62		15 11,374.00	15 11,374.00	44 49,106.62
HAINES JUNCTION	4 36.03		4 36.03				4 36.03
MAYO	14 30.19	2 1.01	16 31.20	3 3.50	6 5,209.01	9 5,212.51	25 5,243.71
OLD CROW	1 .10	1 5,500.00	2 5,500.10		1 100.00	1 100.00	3 5,600.10
ROSS RIVER	3 11.30	1 10.00	4 21.30		1 80.00	1 80.00	5 101.30
TESLIN	5 .34	1 3.00	6 3.34		1 150.00	1 150.00	7 153.34
WATSON LAKE	25 24,912.18	1 5.00	26 24,917.18	1 3.50	10 28,106.20	11 28,109.70	37 53,026.88
WHITEHORSE	39 2,569.70	1 .10	40 2,569.80				40 2,569.80
TOTAL FIRES	119	21	140	4	43	47	187
AREA BURNED (HECTARES)	63,323.13	16,102.72	79,425.85	7.00	49,936.97	49,943.97	129,369.82

NUMBER OF FIRES DISCOVERED BY DETECTION AGENCY

TABLE 02

19 91

(BOTH ZONES)

DETECTION AGENCY	FOUGHT	NOT FOUGHT	TOTAL
YUKON LANDS AND FOREST SERVICE AIRCRAFT	37	48	85
OTHER AIRCRAFT	5	7	12
YUKON LANDS AND FOREST SERVICE TOWERS	18	1	19
YUKON LANDS AND FOREST SERVICE PERSONNEL ON DUTY	6	2	8
GENERAL PUBLIC	53	2	55
OTHER AGENCIES (N.W.T., ALASKA, B.C.)	4	4	8
TOTAL FIRES	123	64	187

SIZE CLASS AND AREA BURNED BY PRIORITY ZONE

TABLE 03

1991

	ACTION ZONE			OBSERVATION ZONE			
CLASSIFICATION	**FOUGHT**	**NOT FOUGHT**	**SUB TOTAL**	**FOUGHT**	**NOT FOUGHT**	**SUB TOTAL**	**TOTAL**
A **to 0.10**	54 1.31	3 .12	57 1.43		2 .02	2 .02	59 1.45
B **.11 - 1.00**	21 10.38	1 1.00	22 11.38	2 1.50	4 2.95	6 4.45	28 15.83
C **1.10 - 10.00**	26 78.14	4 20.00	30 98.14	2 5.50	5 24.00	7 29.50	37 127.64
D **10.10 - 100.00**	3 106.60	3 210.00	6 316.60		8 385.00	8 385.00	14 701.60
E **100.10 - 1000.00**	4 2,831.70	5 1,801.60	9 4,633.30		17 9,245.00	17 9,245.00	26 13,878.30
F **1000.10 -10000.00**	9 32,195.00	5 14,070.00	14 46,265.00		5 15,100.00	5 15,100.00	19 61,365.00
G **10000.10 -100000.00**	2 28,100.00		2 28,100.00		2 25,180.00	2 25,180.00	4 53,280.00
H **over 100000.10**							
TOTAL FIRES	119	21	140	4	43	47	187
AREA BURNED (HECTARES)	63,323.13	16,102.72	79,425.85	7.00	49,936.97	49,943.97	129,369.82

NUMBER OF FIRES AND AREA BURNED BY MONTH AND ZONE

TABLE 04

19 91

	ACTION ZONE			OBSERVATION ZONE			
MONTHS	FOUGHT	NOT FOUGHT	SUB TOTAL	FOUGHT	NOT FOUGHT	SUB TOTAL	TOTAL
APRIL	8 6.73		8 6.73				8 6.73
MAY	28 103.66		28 103.66				28 103.66
JUNE	63 62,388.90	14 10,408.62	77 72,797.52	4 7.00	29 45,809.96	33 45,816.96	110 118,614.48
JULY	13 558.70	7 5,694.10	20 6,252.80		13 4,127.00	13 4,127.00	33 10,379.80
AUGUST	7 265.14		7 265.14		1 .01	1 .01	8 265.15
SEPTEMBER							
OCTOBER							
NOVEMBER							
TOTAL FIRES	119	21	140	4	43	47	187
AREA BURNED (HECTARES)	63,323.13	16,102.72	79,425.85	7.00	49,936.97	49,943.97	129,369.82

NUMBER OF FIRES BY CAUSE, SIZE, AND ZONE

TABLE 05

1991

	ACTION ZONE			OBSERVATION ZONE			
CAUSE	FOUGHT	NOT FOUGHT	SUB TOTAL	FOUGHT	NOT FOUGHT	SUB TOTAL	TOTAL
RECREATION	25 1,512.47	1 .10	26 1,512.57				26 1,512.57
SETTLEMENT	10 99.25		10 99.25				10 99.25
WOOD OPS.							
INCENDIARY	12 6.60		12 6.60				12 6.60
OTHER INDUSTRIES	7 1.27		7 1.27				7 1.27
MISC. KNOWN	6 .15		6 .15				6 .15
UNKNOWN							
LIGHTNING	59 61,703.39	20 16,102.62	79 77,806.01	4 7.00	43 49,936.97	47 49,943.97	126 127,749.98
TOTAL FIRES	119	21	140	4	43	47	187
AREA BURNED (HECTARES)	63,323.13	16,102.72	79,425.85	7.00	49,936.97	49,943.97	129,369.82

AREA BURNED (HECTARES) BY FOREST CLASSIFICATION AND PRIORITY ZONE

TABLE 06

1991

ACTION ZONE		OBSERVATION ZONE		
FOREST CLASS.	SUB TOTAL	FOREST CLASS.	SUB TOTAL	TOTAL
SAW TIMBER	3,833.81	**SAW TIMBER**	701.00	4,534.81
PULPWOOD	38,738.62	**PULPWOOD**	12,720.01	51,458.63
IMMATURE	3,018.57	**IMMATURE**	2,215.75	5,234.32
CUTOVER	.02	**CUTOVER**	0	.02
UNPRODUCTIVE	29,434.83	**UNPRODUCTIVE**	38,707.21	68,142.04
AREA BURNED (HECTARES) *	75,025.85	*	54,343.97	129,369.82

* Area burned reflects hectares attributed to zone when a fire burns into both zones. Differences are noted in previous five (5) forms.

NUMBER OF NON-CONTRACT AIRCRAFT AND HOURS-FLYING TIME

TABLE 07 PART 01

19 91

FIXED WING AIRCRAFT	NUMBER OF	HOURS FLOWN (Km)
A-26 Douglas Invader	4*	21.3
DC-6 (Tankers)	2*	9.0
DC-3	3	10.6 +(1706)
DC-4	1	+(9254)
PA-34	3	63.6 +(4620)
PA-31	2	+(3138)
PA-42	1	+(4088)
TS-60	4	96.1
S2F (Fire Cats)	6	195.6
C-185	1	1.1
C-206	3	11.7 +(2881)
C-207	1	1.7
C-401	1	+(3355)
DHC-2	1	41.0 +(982)
DHC-3	2	18.0 +(3329)
MAUL	1	9.4
MERLIN 4	1	7.8 +(4216)
SUB TOTAL	37	486.9 +(37,569km)

* Includes MARS equipment.

ROTARY WING AIRCRAFT	NUMBER OF	HOURS FLOWN
205A	5	311.6
206B	29	1654.3
204B	4	423.0
206L	4	270.8
212	2	164.5
500D	2	43.5
SUB TOTAL	46	2867.7

TOTAL OF F-W AND R-W	83	3354.6 +(37,569km)

NUMBER OF CONTRACT AIRCRAFT AND HOURS FLYING TIME

TABLE 07 PART 02

1991

FIXED WING	NUMBER OF	HOURS FLOWN
A-26 Invaders C-206 DC-3 PA-34 (Subst.) TS-60	6 2 1 1 2	410.6 434.3 200.0 5.3 215.2
SUB TOTAL	12	1265.4

ROTARY WING	NUMBER OF	HOURS FLOWN
* Short term contracts in casual section.		
SUB TOTAL	0	0

TOTAL FOR F-W AND R-W	12	1265.4

SUMMARY OF AIRCRAFT UTILIZATION

TABLE 07 PART 03

METHOD OF HIRE	NUMBER	FIXED WING	ROTARY WING	HOURS	KM
NON-CONTRACT	83	37	46	3354.6 +	37569
CONTRACT	12	12	0	1265.4	
TOTAL	95	49	46	4620.0 +	37569

AIR TANKER AND HELITANKER UTILIZATION

TABLE 08

1991

FIXED WING

AIRCRAFT TYPE	NUMBER	CONTRACT OR CASUAL	HRS. FLOWN ON AIR ATTACK	HECTOLITRES DROPPED		
				WATER	S. TERM	L. TERM
A-26	6	Contract	410.2			12,852.0
A-26	3	Casual	4.4			326.7
DC-6	1	Casual	9.0			113.5
S2F (Firecats)	6	Casual	195.6			4,712.9
A-26 DC-6	1 1	MARS - Alta MARS - B.C.	16.9 (Hours billed)			471.9 3,020.0
SUB TOTAL			636.1	0	0	21,497.7

HELITANKER

AIRCRAFT TYPE	NUMBER	CONTRACT OR CASUAL	HRS. FLOWN ON AIR ATTACK	HECTOLITRES DROPPED		
				WATER	S. TERM	L. TERM
205A	5	Casual and short term contracts.	311.6	28,366.8		
206B	29	Casual and short term contraxts	1,654.32	12,545.7		
204B	4	Short term contracts.	423.0	30,990.4		
206L	4	Short term cont. and casual.	270.8	1,003.7		
212	2	Short term cont.	164.5	26,610.7		
500D	2	Short term cont.	43.5	801.46		
SUB TOTAL			2,867.7	100318.8	0	0

TOTAL HOURS FLOWN ON AIR ATTACK AND HECTOLITRES DROPPED	HRS. FLOWN ON AIR ATTACK	WATER	S. TERM	L. TERM
	3,503.8	100318.8	-	21,497.7

FORESTRY CANADA

FORESTRY CANADA

Exchange of Information
Forestry Canada

Canadian Committee
on
Forest Fire Management

40th Annual Meeting
January 29-31, 1992
Ottawa, Ontario

FORESTRY CANADA ONTARIO REGION (FCOR)

The cooperative Canada/US investigation into the behaviour and atmospheric environmental impact of large-scale, mass-ignition prescribed fires continued in 1991, with the detailed monitoring of one 500 hectare prescribed burn carried out by the ONtario Ministry of Natural Resources in northern Ontario. This study, coordinated by FCOR, has been ongoing in Ontario for 5 years, with 8 burns being studied during this period. A large number of papers describing fire behaviour and smoke chemistry on these burns were presented by Canadian and US scientists at the 11th Conference on Fire and Forest Meteorology in Montana in 1991. Cooperating agencies this year included FC, the United States Forest Service, the Atmospheric Environment Service, and the University of Iowa. Research activities were concentrated on investigating in-fire windfield and fire behaviour dynamics, in order to determine overall energy release rates on this type of mass-ignition burn. Future cooperative fieldwork is planned for 1992, and emphasis is now being placed on modelling fire and convection column dynamics in relation to ignition patterns, interactive fire behaviour, and atmospheric conditions.

The study of point- and line-source fire behaviour in Ontario continued in 1991, with the conducting of three experimental line-source fires in semi-mature jack pine. A threshold for the onset of crowning was established for this fuel type through these burns. While line-ignition experimental fires accelerated to the crowning phase easily under the proper conditions, point-source fires ignited under similar conditions spread slowly and showed no tendency to accelerate, likely due to an inability to access the ambient windfield.

FCOR fire researchers continue to be actively involved in both the FC Fire Danger Group and the FC Prescribed Fire Working Group. FDG activities included the production of a publication describing the development and structure of the Canadian Forest Fire Behaviour (FBP) System, the conducting of technology transfer sessions on the FBP System in New Brunswick and Alberta, and the presentation of a paper on the Canadian approach to fire behaviour prediction at an international fire research conference in Portugal. The PFWG conducted a workshop on prescribed fire in Quebec and participated in a joint FC/USFS meeting on prescribed fire in Montana.

Cooperative investigations with NASA Langley scientists into the effect of global biomass burning on atmospheric chemistry continued in 1991. Smoke chemistry measurements were made on a prescribed fire on the Yucatan Peninsula o mexico, and a series of grassland fires in South Africa were monitored. Satellite imagery is currently being used to inventory biomass burning in Africa, South America, and Siberia, while smoke sampling will be carried out in both Africa and the Northwest Territories of Canada over the next year. FCOR fire researchers are also involved in planning the 1992/93 Southern Tropical Atmospheric Research Experiment (STARE), along with fire and atmospheric scientists from a number of countries.

A number of proposals submitted by FCOR fire researchers were accepted for funding under the Green Plan in 1991, and this will result in increased emphasis on modelling mass fire behaviour and impact, global warming and the forest fire business, improving the resolution of future climate projects, and FC participation in addressing the tropical biomass burning/atmospheric chemistry problem over the next five years.

FCOR fire researchers have been exploring the use of Geographic Information Systems (GIS) in analyzing fire weather and fire report data over the past year, and have completed a report on vegetation succession following crown fires in jack pine.

NORTHWEST REGION (Northern Forestry Centre)

The Fire Management Research Project initiated a strategic planning exercise to guide research and technology transfer activities over the next five years. A client survey has been conducted which will provide the basis for the project's strategic plan which will be completed early in the new fiscal year.

Bryan Lee, Kerry Anderson, Scott Henderson, and Dick Smith continued their work on the development of the Intelligent Fire Management Information System (IFMIS). The work concentrated on developing optimization routines for resource deployment and on batching routines to automate daily routines. The IFMIS software was used operationally in Alberta, Saskatchewan, Manitoba, and Alaska for the 1991 fire season. IFMIS is being evaluated in Ontario, B.C., N.W.T., New Zealand, Greece, Italy, and Portugal.

Kerry Anderson completed his M.Sc. in geography (specialization in meteorology). In his master's thesis, "Models to predict lightning occurrence and frequency over Alberta," Kerry produced models to predict lightning occurrence and frequency based on upper air sounding data and severe weather composite maps.

Scott Henderson continued to work on the Microsoft Windows implementation of IFMIS. Currently, this involves work in two areas: implementing the MAPPER in Windows, and a new improved FWI module in Windows. Scott assisted in training Saskatchewan personnel on the IFMIS system this year, and also trained personnel in the Northwest Territories Centre for Remote Sensing on the methods used to convert information from geographic information systems to the IFMIS format.

Dick Smith is continuing in his efforts to enlarge the fire environment database. This database consists of approximately 2500 station-years of weather data for lookout towers and automatic weather stations in the northwest region.

Kelvin Hirsch conducted a review of client needs in the area of fire suppression systems and strategies research. This review will serve as a primary component for a problem analysis on fire suppression research at the Northern Forestry Centre. Kelvin also developed presentation materials and operational exercises for a three day seminar on the Canadian Forest Fire Behaviour Prediction (FBP) System. These materials were presented at four workshops in the past year and an interactive workbook on the FBP System will be completed in the near future. Kelvin completed a literature review and initiated work on an initial attack containment model. He also developed a theoretical model for determining the amount of thinning and pruning required to influence crown fire rate of spread in response to wildland/urban interface problems in Banff National Park.

Chuck Ogilvie, in cooperation with the Alberta Forest Service, conducted operational tests of a forward looking infrared scanner on an air attack aircraft. The scanner equipped aircraft transports the Air Attack Officer who coordinates the efforts of two Canadian CL215 water bombers. The infrared scanner gives a clear picture of fire growth and intensity, as well as the placement and effectiveness of the drops. A video recorder and printer are being used to deliver infrared intelligence to ground forces and a global positioning system is being experimented with. As a result of the 1991 tests, the Alberta Forest Service plans to purchase four infrared systems which will equip half of their Air Attack fleet in 1992. Chuck also gathered data on a number of operational fires on the effectiveness of foam.

Forestry Canada, with financial assistance from the Ontario Ministry of Natural Resources, the Canada/British Columbia Partnership Agreement in Forestry, and the Green Plan has arranged to purchase a high resolution infrared camera for the Aerial Infrared Data Management and Analysis System (AIDMAS). AIDMAS has been used for the past four years to monitor prescribed burns in northern Ontario as part of the Canada/US mass fire study. In addition to the Ontario work, monitoring was conducted in British Columbia to provide data for prescribed fire and wildfire modelling.

Bill De Groot has been working with the Government of the Northwest Territories, the provinces of Saskatchewan and Alberta, and the Canadian Parks Service in development of prescribed fire guidelines. Bill and Murray Maffey participated on operational burns in the NWT and Alberta to collect data for fire intensity - fuel consumption and vegetation response guidelines. Bill also completed an initial compilation of prescribed fire predictors applicable to the Northwest Region. He developed a prescription building procedure utilizing these predictors for operational burns and presented courses on their use in Saskatchewan and Alberta. Bill is participating on Saskatchewan's Prescribed Burn Committee, Alberta's Prescribed Burn Manual Task Force, and the Northwest Territories Fort Providence Management Plan Committee. He is also working on a fire history study of the Mackenzie Bison Sanctuary in the NWT, and is currently taking part-time graduate studies at the University of Alberta.

Murray Maffey has been assisting Bill De Groot and Kelvin Hirsch in their field studies. He is also processing and ageing tree discs fro the fire history study of the Mackenzie Bison Sanctuary. As well, Murray has been reorganizing the Fire Research Library at NoFC. He has entered all articles, reports, reprints. etc. from the fire library into a computer librarial software package so that literature searches can be done quickly.

A Spanish cooperative student, Cristina Vega-Garcia has joined Forestry Canada, Northwest Region for two years. Cristina is conducting research on the application of spatial attribute theory and neural networks to person-caused fire occurrence prediction. This research is being conducted as partial requirement for a Master's thesis at the University of Alberta.

Marty Alexander will complete his development leave in Australia at the end of March, 1992. He will then be going to New Zealand on secondment to assist with the national Fire Research Program. While in New Zealand, he plans to finish his Ph.D. thesis on 'Crown Fire Behaviour in Exotic Pine Plantations of Australasia'. He will return to the Northern Forestry Centre in March 1993.

PACIFIC & YUKON REGION (Pacific Forestry Centre)

Further reorganization of Pacific Forestry Centre research programs took place this year, with a new Fire Management program being established within the Conservation and Forest Health component of the Research Division. Two new projects have been established, both funded in part by the new (1991-1995) Canada/B.C. Forest Resource Development Agreement (FRDA II). One project, led by B.D. Lawson, will develop fire behaviour and suppression models for spruce-balsam forests, while the second project, led by S.W. Taylor, will develop models of smoke production and dispersion to improve the management of prescribed fire smoke and emissions.

During the current field season, work began on both projects, with cooperation from other ForCan establishments (GLFC, NoFC), Canadian Parks Service, B.C. Forest Service, and forest industrial firms (West Fraser, Northwood Pulp & Timber, Slocan Forest Products). Fire behaviour study plots were established on large (> 1000 ha) prescribed burns in mature forests in Banff National Park, with additional work planned for the next several years. These burns will help to evaluate and revise the models for rate of spread, acceleration of spread and steep slope effect on spread rate for several fuel types represented in the Canadian Forest Fire Behaviour Prediction (FBP) System.

Smoke production and dispersion was studied this season on four prescribed burns for logging slash disposal in the interior of British Columbia. Fuel consumption, combustion rate, duration of flaming and smoldering combustion phases, convection column rate of rise and height attained, smoke plume trajectory and upper atmospheric profile conditions are some of the variables measured and observed on these burns in order to evaluate and refine models of prescribed fire behaviour and atmospheric impact.

Cooperative work continued with the Fire Danger Group (publication and presentation of Technology Transfer and poster sessions on the FBP System), and with the Prescribed Fire Working Group (publication of a national review of the status of prescribed fire use and knowledge).

Liaison on the international use of the Canadian Forest Fire Danger Rating System continued, with advice supplied to New Zealand, South Africa and Alaska.

Bruce Lawson was appointed Program Head, Fire Management, in February 1991. Brad Hawkes completed his course work towards the Ph.D. degree at the University of Montana, returning to PFC in August to complete his laboratory research on the physics of slash and forest floor combustion. Steve Taylor continues to lead the prescribed fire project, in a position supported by FRDA II.

PETAWAWA NATIONAL FORESTRY INSTITUTE

Work has begun in the Fire Management Systems project on the Next Generation Fire Management System. Advanced RISC computer systems provide the platform for a new integrated Fire Management Information System. Integrated into this new system will be significant advances made by Bryan Lee at the Northern Forestry Centre.

The Fire Equipment, Products and Methods project continued their cooperative work in organizing Fire Stop III, an international conference on fire control equipment and methods. Project personnel have also been active in the NWCG fire equipment working team and the CCFFM Forest Fire Equipment Subcommittee. Also, they continue to struggle cooperatively towards an international standard for wildland fire fighting foam.

The Fire Behaviour and Ecology project has been busy organizing the Frontier Lake Experimental Fire Project. This multifaceted research project combines fire behaviour research, with prescribed fire, fire ecology and fire equipment testing. Perhaps the most unique aspect is the prescribed fire study which will compare seedling nutrient use efficiency on burned sites (several intensities) with mechanically site prepared and untreated plots. Recently joining the project to augment the Fire Ecology research capabilities is Dr. Luc Duchesne. Also joining the project is Mike Hobbs, replacing the retiring Jack Bell.

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CANADIAN PARKS SERVICE

CANADIAN PARKS SERVICE

CANADIAN COMMITTEE ON FOREST FIRE MANAGEMENT-1992 ANNUAL MEETING

FIRE MANAGEMENT IN NATIONAL PARKS

BACKGROUND

The evolution of a number of Canadian ecosystems depends on a cyclical fire occurrence. Over 80,000 sq. km. of Canadian Parks Service (CPS) wildlands are categorizable as fire dependent. Without fire these wildlands ecosystems can be expected to evolve to a drastically different ecosystem.

The National Parks Act requires that CPS maintain the ecological integrity of lands under its jurisdiction. This direction provides impetus to effectively manage fire. Fire control, while it may protect people and property, will not adequately maintain ecosystem integrity. Effective use of prescribed fire is essential to meet our legislated mandate and to reduce the risk of escape fire.

Time is a critical consideration for managing fire in boreal ecosystems. Rapid situation evaluations, decision making, and choosing are appropriate course of action is required. Isolation in management is not possible. Cooperation with the provinces and other agencies involved in fire management is required. Substantial resourcing must also be available.

To foster cooperation, CPS has been an active member of the CCFFM and CIFFC. CPS adheres to the Mutual Aid Resources Sharing Agreement (MARS). At the provincial level Quebec Parks are members of the Société de conservation. Elsewhere individual parks maintain local agreements with neighboring land management agencies. The CPS has implemented a Fire Preparedness System and Guidelines to ensure that human and financial resources are effectively utilized. These guidelines stipulate procedures for maintaining initial fire attack capabilities.

ACTION PLAN FOR ALLOCATING GREEN PLAN RESERVE - FIRE MANAGEMENT

DELIVERABLE: Expanding forest fire protection

EXPECTED RESULTS

- by 1993, a capability will be in place to commence an upgraded fire ecology program (research and application) and coordinate fire operations.
- by 1993, park fire control capabilities will approach national and provincial standards. Most field units will have access to required equipment and staff.

- by 1996, CPS will have fully integrated ecological principles into fire use decisions, which will prevent loss of CPS assets and adjacent provincial and private assets from forest fire.
- by 1996-97, parks will have the full capability to use fire as a management tool to satisfy vegetation objectives and thereby contributing to ecological integrity.

91-92		**92-93**		**93-94**		**94-95**		**95-96**		**96-97**		**Total**	
PY	$000	PY	$000	PY	$000	PY	$000	PY	$000	PY	$000	PY	$000
3	875	10	1800	13	2235	16	2305	20	2620	25	3165	25	13000

1- General fire situation for 1991

An analysis suggests the historical fire frequency on land managed by the CPS resulted in annual burn area often in excess of 1000 square km. Fire control since park creation has reduced the area to an annual average of 500 square km. In 1991, the total burned area represents 12.23 square km. The following table summarizes the total burned area for 1991 fire season.

	No.fires	**Lightning**	**Others**	**Area burned(Ha)**
WESTERN	17	9	8	433.0
PRAIRIES	21	20	1	764.9
ONTARIO	8	8	0	16.9
QUEBEC	0	0	0	0
ATLANTIC	10	1	9	8.0
TOTAL	**56**	**38**	**18**	**1222.8**

(The above does not include prescribed burns)

- * 1991 fire season relative to the past 30 years is considered to have been below average.
- * In 1991, 13 prescribed fires have been conducted for a total of 2608 ha.
- * A comparison with previous years follows.

YEAR	FIRES	HECTARES
1991	56	1222.8
90	128	25041.1
89	131	834.0
88	73	331.0
87	93	140.0
86	90	2662.0
85	128	5646.0
84	161	14207.0
83	93	5209.0
82	104	9113.0
81	145	680173.0
1980	108	173002.0

2- Aircraft utilization report

FIXED WING

Aircraft type (Reg)	Number	Hours Bombing	Litres dropped (Ret/Foam/Water)
(WRO)			
DC-6	2	3.5h.	casual: 5400L/T Ret casual: 10500 water
(P&NR)			
B-25	4	22.3h. 9.9h.	contract:41250L/T Ret casual: 11250L/T Ret
C-210	1	N/A	
C-185	2	N/A	
(ORO)			
	NIL		
(QRO)			
	NIL		
(ARO)			
Air tanker M-18	6	10.5h.	contract:14724L/T Ret
Bird dog	1	2 h.	
Subtotal		Hours: 48.2h.	Litres Water: 10500 Foam : Nil Long term : 72624 Short term : nil
		Total :	83124 Litres

ROTARY WING

Aircraft type	Number	Hours Bombing	Litres dropped (Ret/Foam/Water)
(WRO)			
L3, 204, 205	3	50 h.	casual: 500100 water
206B	1	10.6h	contract: 2600 water
(P&NR)			
A-Star	6	15 h	contract and casual; 40000 water
(ORO)			
Bell 206	1	13.9h.	casual no water used
Hughes 500D	1	33.4h.	casual no water used
(QRO)			
	NIL		
(ARO)			
	NIL		
Subtotal:		Hours: 122.9h.	Litres: Water: 542700 Foam : nil Long term: nil Short term: nil Total: 542700
GRAND TOTAL:		171.1 h.	625824 Litres

3- Equipment development and testing

CPS Atlantic Regional Office (ARO) participated as an observer in the Atlantic Region Working Group and will be joining as a full member pending approval of the Group.

Pukaskva National Park (Ont) purchased and installed 2 Campbell Scientific Remote weather stations for the next fire season. These are to be part of a 3-4 station network being established in the Park.

Prince Albert National Park continues to work closely with the Prince Albert Fire Control Centre and relies heavily on PA Forest Fire Committee (PAFFC) for fire weather and preparedness level information. In order to remain compatible in terms of information exchange, PANP will be upgrading to Fire Weather Plus Software (REM/s) in 1992.

Wood Buffalo National Park (WBNP) has recently purchased a Forest Technology Systems second generation weather station and software which provides significant improvement over the old suitcase model. This new station will permit WBNP to use Fire Weather Plus instead of the similar Fire Weather Analysis Program (FWAP) currently used by other parks and incorporated into the Parks Fire Information System (PFIS).

Banff National Park evaluated Tovex Firebreak Explosives. The product appears to have application where large amounts of line must be constructed or where access for large crews is difficult. Since it is expensive (@ $2.20/ft) and has a limited shelf life purchase was deferred.

Jasper National Park has put together a new sawpack which seems to work very well in the field.

The park fire information system continues to be upgraded and implemented across CPS through a contract arrangement with the Maniwaki Technology Transfer Centre. All "fire parks" are to be be linked with this system to serve as a fire communication system, internal resource sharing network and to archive FWI information and to allow FBP and other analysis functions to be carried out. Improvements for 1992 include development of a national fire danger map which will incorporate data from over 300 stations and the provision of regional weather forecasts via AES ANIKOM.

4- Fire prevention activities

At Fortress of Louisbourg, Cape Breton fuel reduction exercise was conducted by burning the grass around heritage facilities. A fire management plan is being prepared for the site.

Banff townsite was divided into 3 wildfire danger zones. Development guidelines were prepared for each zone. This information was requested by the Town of Banff to consider in their planning and revised land use bylaw.

Work is ongoing to provide direction for Facility Protection within Jasper National Park. Production of a Facility Protection Plan should be well underway by spring of 1992.

5- Training

Fire training remains a priority of the CPS. In accordance with National Training Strategy the CPS decided to purchase 8 interactive video-disk workstations (SONY VIV 5000AHD, 286 model) for Fire Management Training purposes. The equipment will be distributed at Regions and Parks level.

The following summarizes the training effort in CPS during 1991.

Course	# Participants	Offered by
WRO		
Fire command team.	11	CPS
Fire behavior prediction system.	10	Can.For.Ser.(CFS)
Sector boss.	5	For.Tec.School Hinton.
Heli-Rappel	4	FTS , Hinton.
Fire line safety	42	CPS
Aerial Ignition	1	Alta.For.Ser.(AFS)
Total:	73	
P&NRO		
Fire behavior prediction system.	4	CFS, Hinton
Advanced fire behavior course	3	AFS, Hinton
Total:	7	
ORO		
Fire command team	1	CPS
Crewboss	2	OMNR
FBP system tech. transfer	2	CFS, Hinton
Total:	5	
QRO		
Plan de brûlage dirigé (Prescribed burning course)	1	AFS, Hinton
Sector Boss	2	FTS, Hinton
Advanced fire behavior	1	For.Can., Thunder B.
Météo forestière	2	Société de Conser., Québec
Total:	6	

ARO		
Sector boss	1	FTS, Hinton
Advanced fire behavior	2	AFS, Hinton
Total:	3	

Grand Total: 94

6- Prescribed burning:

Regions	Frequency	Hectares
Atlantic	0	0
Québec	1	13.0
Ontario	0	0
Prairie & North.	0	0
Western	12	2595.0
Total:	13	2608.0

In September 1991, La Mauricie National Park (Québec) successfully completed its first prescribed burn. The objectives were training and the rehabilitation of 13 hectares of a white spruce plantation.

7- Publications, Films and Videos;

Internal reports.

Pukaskwa National Park Fire Management Plan (Draft)
(Should receive approval this winter)

Arbor Wildland Management Services. 1991. Wildland-Urban Interface Forest Fire Potential and Reduction Plan for Banff Townsite and Surrounding Area. Banff Nat. Park, Box 900 Banff, TOL OCO.

C. Tymstra. 1991. Fire History Of Yoho Nat. Park British Colombia and Implications for Fire Management. Yoho Nat.Park.

8- Organizational changes;

Ontario Region:

James Barlow has been appointed Chief, Natural Resource Conservation, ORO. (Cornwall, Ontario)

Dan Couchie has been appointed Chief Park Warden, Pukaskwa National Park.

Atlantic Region:

Chip Bird has been appointed Regional Fire Coordinator in replacement of David Bradshaw.

National Capital Region:

David Lohnes retired March 1991. Nik Lopoukhine is the acting Director, Natural Resources Branch.

Stephen Woodley has been appointed Forest Ecologist.

9- Other items of interest to Committee;

Atlantic Region:

CPS PEI District has signed agreements with two local Fire Departments for suppression services.

Parks are still in various stages of discussion/negotiations with relevant Provincial Fire agencies re an MOU for wildfire suppression support.

Ontario Region:

The Fire Agreement that Pukaskwa has with the OMNR for the provision of pre-suppression services was renegotiated in 1991.

CPS is seeking partnership opportunities for cost-sharing to establish mutually beneficial weather monitoring stations in Alberta, Saskatchewan, Manitoba and the NWT.

10-Research and Development Projects;

Québec Region:

QRO is planning a second Prescribed Burn in La Mauricie NP for 1992.

Ontario Region:

Pukaskwa has completed a draft Fire Management Plan, including a preliminary interactive computer model. The computer model is available to interested parties by contacting Greg Fenton Senior Park Warden, Pukaskwa National Park.

Prairie & Northern Region:

In Prince Albert National Park (PANP), the project to upgrade equipment and conduct fuel hazard reduction in developed areas of the park continue. A major study to document the historic role of fire in PANP was initiated in 1991 and will continue through 1992.

Wood Buffalo National Park (WBNP) is continuing to collaborate with Chris Larsen concerning the fire history of WBNP. He is currently analyzing the fire weather and occurrence data bases.

The work on fire climatology in WBNP is continuing. A final report should be complete in 1992. The scope of this project is to present a historical analysis of synoptic scale weather and fire danger that has resulted in significant fire occurrence and fire behavior.

Also scheduled for WBNP is research concerning detection, fire weather and communication requirements. It is anticipated that GIS will be used to analyze current operations and to provide direction for future decisions.

Acquisition of a remotely sensed park vegetation map continues to be a high priority and funding has been ear-marked for this purpose. A good digital terrain model has been completed and an incomplete MS image of the park obtained. A fuel/veg. map of WBNP is expected.

11- Research needs;

To adapt prevention methods to establish Fire Line perimeter around future Prescribed burn projects.

CANADIAN PARKS SERVICE-1991

Appendix 1

AIRCRAFT UTILIZATION REPORT

Agency: Canadian Parks Service **Year: 1991**

1- FIXED WING

Aircraft type	No	Hours Bombing	Litres Dropped Ret./ Foam/ Water
DC 6	2	3.5 h.	Casual: 5400 L/T Ret.
			Casual: 10500 Water
B-25	4	22.3 h.	Contract: 41250 L/T Ret.
		9.9 h.	Casual : 11250 L/L Ret.
C-210	1	N/A	
C-185	2	N/A	
Air-Tanker M-18	6	10.5 h.	Contract: 14724 L/T Ret.
Bird dog	1	2 h.	
SUBTOTAL:		48.2 h.	Litres; Water: 10500 Foam: Nil Long Term: 72624 Short Term: Nil 83124 Litres

2-ROTARY WING

L3, 204, 205	3	50 h.	Casual: 500100 Water
206 B	1	10.6 h.	Contract: 2600 Water
A-Star	6	15 h.	Contract and casual 40000 Water
206	1	13.9 h.	Casual no Water used
Hughes 500 D	1	33.4 h.	Casual no Water used
SUBTOTAL:		122.9 h.	Litres: Water: 542700 Foam, L/T, S/T,: Nil 542700 Litres

GRAND TOTAL: **171.1 hours** **625824 Litres**

CANADIAN INTERAGENCY FOREST FIRE CENTRE

CANADIAN INTERAGENCY FOREST FIRE CENTRE

CANADA REPORT
1991

The major fire activity this year was east of Manitoba with the north and west generally cooler and wet.

Late May, saw extreme fire behaviour and hazard across Ontario. This coupled with a large number of man caused fires required the movement of 2 CL-215 groups to be brought in from the Northwest Territories. During the same period in late May the hazards continued to climb in Quebec, Nova Scotia and New Brunswick with numerous man caused fires occurring daily.

By June 1, things had eased slightly but by the second week of June the hazards rose again and fire starts climbed. 2 additional CL-215 groups were moved back into Ontario and 1 CL-215 was moved into New Brunswick from Newfoundland to assist with a 2,500Ha blaze. Quebec was also facing extreme hazards and a number of problem fires with structure losses.

By June 8, the New Brunswick situation had worsened requiring additional pumps, hose and another CL-215 from Newfoundland. The Northeastern Compact was activated with 2 medium R/W, 20 pumps, 400 lengths of hose and 150 shovels being mobilized from Maine, Rhode Island and Massachusetts. By mid-June the situation had stabilized somewhat in New Brunswick but the hazards continued to climb in Quebec.

June 18, saw multiple fire starts in Quebec. 2 CL-215 from Newfoundland were moved in to assist. As the situation intensified more resources were mobilized. 1 CL-215 group from Saskatchewan and 1 CL-215 group from Alberta were added to their fleet. A number of fires escaped initial attack resulting in large hectarage losses and evacuations.

During this period the Yukon also experienced multiple starts leading to project fires and the import of land based tankers, overhead teams, sustained action crews and initial attack crews from British Columbia.

By June 25, Ontario had 6 additional CL-215s, Quebec had 6 additional CL-215s, Yukon had 2 additional Firecat groups plus ground crews. The Northwest Territories picked up an additional DC6 and equipment had been mobilized to New Brunswick. Canada was 1,000 fires ahead of last year at this time. More personnel and equipment were added to the Yukon forces from Alberta as the situation intensified on June 26.

By July 6, Nova Scotia entered the fray and moved 1 CL-215 in from Newfoundland and some pumps and hose in from New Brunswick. An additional CL-215 from Newfoundland joined New Brunswick's forces on July 10. Quebec also had moved in additional pumps and hose from Newfoundland and New Brunswick, and a burn-out specialist from Ontario as their internal resources became stretched.

By July 12, most airtankers had returned to their home bases. Rain in various locations had lowered the hazard and allowed good progress on large fires.

The CL-215 shuffle started again on July 16, with Manitoba and Ontario taking on extra groups, due to multiple fire starts. Steady fire activity in Ontario, Quebec and Maritimes kept most internal resources committed.

The fire activity remained relatively constant until August, when hot weather stretched across Canada coupled with the dry lightning storms resulted in multiple fire outbreaks in Saskatchewan, Manitoba and Ontario. Additional land based tankers moved into Saskatchewan from the Northwest Territories. An overhead team and crews from Alberta also came in to manage one escaped fire. Equipment from British Columbia and a CL-215 from Quebec moved into Ontario. Requests for CL-215s could not be filled due to high hazards and commitments elsewhere.

By the end of the second week of August, 110 personnel were in Ontario from British Columbia. Orders for CL-215s still could not be filled and medium R/W were scarce. Then British Columbia and the Northwest Territories began to pick up new starts. Problem fires were now listed in British Columbia, Alberta, Saskatchewan, Manitoba, Ontario and Quebec. Fire activities in British Columbia necessitated the recall of one of their 20 man crews from Ontario. Cooler temperatures into the Northwest Territories allowed for the movement of one of their CL-215 group into Ontario and the other into Manitoba.

On August 19, a large fire that had been burning in Alaska invaded the Yukon. This necessitated the activation of the Canada/US Arrangement to allow Alaska to provide structure protection to values on the Yukon side of the fire.

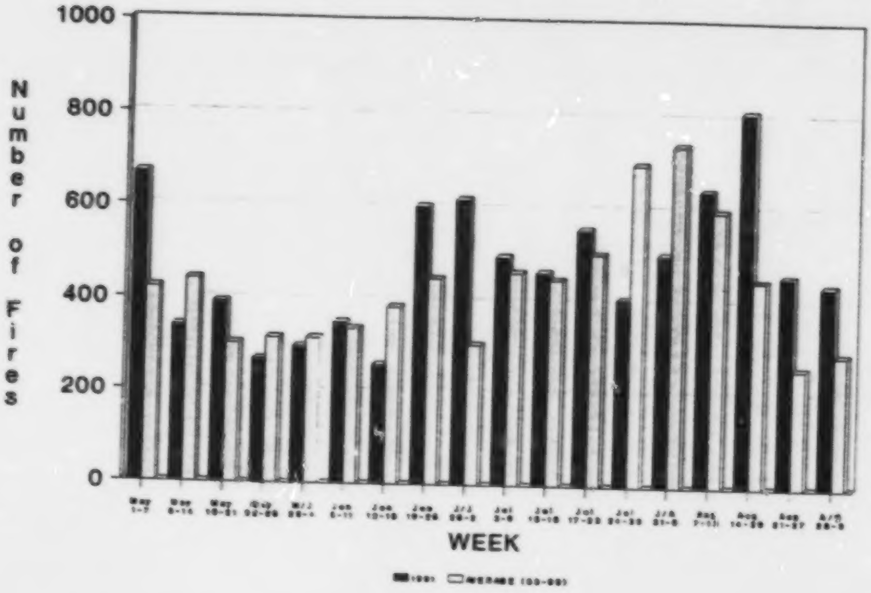
Steady fire activity continued with the slow return of resources as control was achieved.

One last flurry of activity occurred in Ontario at the end of August resulting in the mobilization of 10 initial attack crews and 4 CL-215 groups. By the end of the second week in September all resources were once again back to their home bases.

73 orders were processed through CIFFC this year. As most of the fire activity this year was in the east, which is traditionally skimmer country, the CL-215 was in constant demand. Another high was recorded this year with the movement of approximately 500 fire fighting professionals. This continued growth in the movement of personnel, strongly reinforces the need for nationally accepted training standards.

As far as actual numbers go, Canada experienced an average fire year with 10,343 fires for 1,601,580Ha as of December 31, 1991. Although the fire numbers are average the hectarage lost is a little over half of the national average.

WEEKLY FIRE STARTS



This graph shows fire starts by week for 1991 compared to the 10 year average. As you can see the trend follows fairly close.

The following statistics show once again that out of a total of 10,343 fires burning 1,601,580Ha, 506 occurred in the Observation Zone, burning 958,899Ha. The fires in the Observation Zone accounts for only 4.9% of the total fires, yet accounts for 59.9% of the total burned area.

	FIRES			HECTARAGE (decimal nos rounded up)		
	FAZ	OBZ	TOT	FAZ	OBZ	TOT
BC	2,037		2,037	29,396		29,396
YT	140	47	187	79,426	49,944	129,370
AB	921		921	6,130		6,130
NT	240	91	331	3,580	221,744	225,324
SK	672	90	762	57,308	182,064	239,372
MB	611	64	675	21,698	121,280	142,978
ON	2,441	119	2,560	20,408	298,475	318,883
QC	1,150	61	1,211	379,861	58,438	438,299
NF	135	31	166	38,853	26,521	65,374
NB	656		656	3,335		3,335
NS	733		733	1,775		1,775
PE	48		48	120		120
PC	53	3	56	791	433	1224
TOT	9,837	506	10,343	642,681	958,899	1,601,580

Wildfires in which man-made structures have been lost have become known as "Interface Fires". These fires in which structures have been lost have risen in prominence over the last few years and each summer has dominated the news in one location or another. The following chart shows the 1991 estimate for structural loss as compared to 1990.

STRUCTURAL LOSES

AGENCY	1990	1991
BC	$169,425.00	$180,000.00
YT	$50,600.00	$0.00
AB	$0.00	$0.00
NT	$0.00	$0.00
SK	$0.00	$0.00
MB	$67,500.00	$0.00
ON	$209,150.60	$217,100.00
QC	$70,100.00	$80,896.00
NF	$140,400.00	$410.00
NB	$0.00	$520,500.00
NS	$166,650.00	$109,700.00
PE	$0.00	$0.00
PC	$0.00	$0.00
TOT	$873,825.00	$1,108,606.00

There were 4 fire related fatalities reported during the 1991 fire season compared to 3 in 1990, 0 in 1989, 3 in 1988, 3 in 1987 and 6 in 1986.

WILDFIRE STARTS

TOTAL NUMBER OF FIRES (LIGHTNING AND MAN CAUSED)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	AVERAGE	1991
BC	2,737	2,205	1,704	3,063	3,604	2,194	3,473	1,951	3,537	3,257	2,772.5	2,037
YT	91	204	198	168	110	217	125	115	244	154	162.6	187
AB	1,556	1,272	755	1,370	934	581	1,236	865	795	1,296	1,066.0	921
NT	311	357	337	311	150	206	374	190	613	236	308.5	331
SK	965	596	437	895	520	493	970	1,064	1,020	897	785.7	762
MB	663	425	535	692	346	217	523	982	1,229	568	618.0	675
ON	1,656	1,396	2,244	1,240	887	1,088	1,923	3,260	2,430	1,614	1,773.8	2,560
QC	1,114	1,202	1,652	683	880	830	992	1,331	1,167	852	1,070.3	1,211
NF	131	165	168	101	310	204	287	116	192	197	187.1	166
NB	275	279	252	393	851	588	653	437	392	377	449.7	656
NS	449	491	332	451	583	508	590	328	425	496	465.3	733
PE	40	53	55	38	52	95	52	21	29	38	47.3	48
PC	148	104	93	161	128	90	93	73	131	128	114.9	56
TOT	10,136	8,749	8,762	9,566	9,355	7,311	11,291	10,733	12,204	10,110	9,821.7	10,343

TOTAL AS OF DECEMBER 31, 1991

FAZ FIRE NUMBER - 9,837
OBZ FIRE NUMBER - 506
TOTAL - 10,343

WILDFIRE LOSSES

TOTAL AREA BURNED IN HECTARES (TEN YEAR AVERAGE)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	AVERAGE	1991
BC	106,568	348,695	67,363	19,908	234,647	17,261	36,177	11,462	22,386	72,504	93,697.1	29,396
YT	35,158	254,891	43,006	19,895	15,131	90,568	88,326	6,310	328,910	169,601	105,179.6	129,370
AB	1,305,165	675,674	2,823	80,731	12,840	2,280	36,248	14,051	6,754	31,097	216,766.3	6,130
NT	984,932	302,150	226,841	41,074	204,745	321,710	399,076	66,080	577,584	104,616	322,880.8	225,324
SK	1,647,972	64,587	52,172	321,235	110,128	13,159	226,497	81,110	588,880	187,349	329,308.9	239,372
MB	421,000	14,777	99,153	130,189	11,823	10,342	169,520	507,782	3,281,300	19,800	466,568.6	142,978
ON	177,389	3,847	443,655	120,424	1,007	145,561	75,582	390,796	402,264	183,694	194,421.9	318,883
QC	2,480	7,970	242,222	3,081	2,679	167,551	36,836	275,620	2,109,513	83,345	293,129.7	438,299
NF	13,087	4,392	16,792	7,743	159,744	108,831	17,128	1,780	68,156	47,317	44,497.0	65,374
NB	419	6,198	1,673	512	2,593	39,103	1,199	1,975	343	6,114	6,012.9	3,335
NS	370	617	448	594	1,077	816	564	335	462	1,068	635.1	1,775
PE	146	131	321	202	181	512	113	17	216	102	194.1	120
PC	680,173	9,113	5,210	14,207	5,646	2,663	140	331	835	25,041	74,335.9	1,224
TOT	5,374,859	1,693,042	1,201,679	759,795	762,241	920,357	1,087,406	1,357,649	7,387,603	931,648	2,147,627.9	1,601,580

TOTAL AS OF DECEMBER 31, 1991

FAZ HECTARES CONSUMED	- 642,681
OBZ HECTARES CONSUMED	- 958,899
TOTAL	- 1,601,580

CANADIAN FOREST UNIVERSITIES

Forest Fire Research and Teaching Activities at the University of B.C. - 1991

Exchange of Information Report to Canadian Committee on Forest Fire Management

Submitted by M.C. Feller

Teaching: No new developments

Research:

In the Faculty of Forestry, M. Feller is continuing his studies on -

a) Prediction of nutrient losses to the atmosphere from slashburns in B.C.

b) Effects of slashburning on plant regeneration, on nutrient movement through watersheds, and on aquatic ecosystems in southern coastal B.C.

c) Geographical variation in fire weather and in the Fire Weather Index system codes and indices within the U.B.C. Research Forest at Haney.

d) Effects of different brown-and-burn treatments on fuels, vegetation, soils, and streamwater.

e) Effects of slashburning on soils and vegetation in high elevation Engelmann spruce - subalpine fir ecosystems. This is a joint study with the B.C. Ministry of Forests Research Branch.

f) Influence of fire and other factors on regeneration of western red cedar in southwestern B.C.

In addition, two new studies were established assessing the influence of fire and environmental conditions on the germination and initial growth and survival of tree species. One study focuses on Engelmann spruce and subalpine fir in the higher elevation wetter Engelmann spruce - subalpine fir forests of central B.C. The other focuses on lodgepole pine, "interior" (white - Engelmann hybrid) spruce and subalpine fir in the Sub Boreal Spruce zone in west central B.C.

In the Faculty of Forestry, one graduate thesis on a fire-related topic is currently being conducted - "Effects of slashburning on forest floor bud - and seed-banks" (M.Sc. - Karen Yearsley).

In the Plant Science Department, Dr. M. Pitt is supervising one graduate thesis on a fire-related topic - "Impact of prescribed burning on diffuse knapweed infestations and floral diversity in Kalamalka Lake provincial park" (M.Sc. - Ross Nicholson).

In the Soil Science Department, Dr. T. Ballard is also supervising one graduate thesis on a fire-related topic - "The effects of slashburning on the nutritional status of juvenile coastal plantations" (Ph.D. - Mike Curran).

Publications:

Feller, M.C. 1991. Effects of prescribed fire on long-term productivity of forests. P. 39-56 in "Excuse me, neighbour, is my smoke bothering you?" Central Interior Fire Management Committee Symposium Presentations.

Feller, M.C. 1990. Herbicide application followed by prescribed fire to convert a brush-field into a conifer plantation in south coastal B.C.: A comparison of the initial effects of two treatments. F.R.D.A. Rep. 146, Forestry Canada.

Fyles, J.W., F.H. Fyles, W. Beese, and M.C. Feller. 1991. Forest floor characteristics and soil nitrogen availability on slashburned sites in coastal British Columbia. Can. J. For. Res. 21: 1516-1522.

FOREST FIRE MANAGEMENT ACTIVITIES

University of Alberta

1991

Exchange of Information Report to Canadian Committee on Forest Fire Management

Submitted by: Dr. Paul M. Woodard

Research

Mr. Paul G. Rivard is currently a Ph.D. candidate under the supervision of Dr. Richard Rothwell and Dr. Paul M. Woodard. Paul recently defended his Ph.D. work and is currently revising his thesis, which is titled, "Moisture content dynamics and potential fire hazard of peat". Paul is currently an analyst with Solicitor General's Office in Ottawa.

Mr. Kerry Anderson successfully defended his M.Sc. thesis on 3 October and graduated during the Fall 1991 convocation exercise. Kerry's supervisor was Dr. Bob Charlton in the Department of Geography. Kerry is currently working for Forestry Canada at Northern Forestry Centre.

Mr. Supparat Samran successfully defended his M.Sc. thesis on 9 July, and convocated during the Fall 1991 ceremony. Mr. Samran was supervised by Dr's. Rich Rothwell and Paul M. Woodard. Mr. Samran was funded by CIDA, and has returned to Thailand.

Mr. Surat Kanjanakunchorn successfully defended his M.Sc. thesis on 4 November 1991 and filed this document on 18 November. Surat, who was supervised by Dr. Paul M. Woodard, will convocate during the Spring 1992 ceremony. Mr. Kanjanakunchorn was funded by CIDA, and has returned to Thailand.

Mr. Cordy Tymstra filed his M.Sc. thesis with the Faculty of Graduate Studies and convocated during the Spring 1991 ceremony. Cordy's supervisor was Dr. Peter J. Murphy. Cordy is currently working in the Protection Branch of the Alberta Forest Service.

Mr. Asaph Ogen-Odoi, a Ph.D. student from Uganda, withdrew from his program and returned home. Asaph was supervised by Dr.'s Ross Wein and P. M. Woodard.

Ms. Cristina Vega Garcia, who obtained her undergraduate degree from Spain, continues her work of "Predicting the location of recreational-caused fires in Slave Lake Provincial Forest". Cristina's supervisor is Dr. P.M. Woodard. Cristina is a co-op student in the Fire Management Research Project at the Northern Forestry Centre in Edmonton. Mr. Brian Lee, Director of that Project serves as a member of Cristina's graduate committee.

Mr. John Hogenbirk, a Ph.D. candidate in Botany under Dr. R. Wein's supervision is in the completion stages of his work on "Fire and drought in northern marshes: implications for climate change". John's field sites are in the Peace-Athabasca Delta.

Mr. Simon-Markus Landhaeusser, a Ph.D. candidate under the supervision of Dr. Ross Wein, finished his first field season near Inuik, NWT. Simon-Markus is studying the effect of climate change and fire on the forest tundra boundary in the Arctic.

Mr. Edward Bork, is a M.Sc. candidate in the Department of Animal Science, will study the interactions of fire and herbivory on plant communities in Elk Island National Park, Alberta. Mr. Bork's is co-supervised by Dr.s' Bob Hudson (Animal Science) and Art Bailey (PLant Science).

Ms. Susan Kemmitt - Olsen, is a M.Sc. candidate under Dr. Wein's supervision. Sue is studying the effect of depth-of-burn on the successful establishment of tree species at the tree line near Inuvik, NWT.

Ms. Ruth-Anne Gal, is a Ph.D. student who is being supervised by Dr. Wein. Ruth-Anne is testing computer models that will evaluate the effects of burning on boreal forest dynamics. Ruth-Anne is just beginning her work in our Department.

Mr. Douglas Clark is a new M.Sc. candidate from the Biology program at the University of Victoria. Doug is supervised by Dr. P.M. Woodard. He is currently trying to secure funding to study the effects of fire on grizzly bear food availability.

Mr. Kim Clark is a M.Sc. candidate under Dr. Peter J. Murphy's supervision. Kim is studying the social and environmental values-at-risk from forest fire in the Northwest Territories. The objective of Kim's work is to develop guideliness to facilitate decisions for initial attack in multiple fire situations and in determining the kind and extent of continued fire suppression activities on escaped fires. Kim's work is being funded through the Territorial Fire Centre at Fort Smith.

Mr. Isaac Theophilus, a M.Sc. student in the Department of Plant Science under Dr. Art Bailey, is studying the "Effect of fire on vegetation and wild herbivores in a grassland national park in Botswana. Isaac's work is sponsored by CIDA. With course work finished, Isaac will return home to start field works.

Dr. Peter J. Murphy, Department of Forest Science, working with Dennis Quintilio and Joe Niederleitner completed a study of the fuel problem in the wildland-urban interface of Banff National Park. Recommendations for site-specific treatments were developed and presented for discussion in March (1991). Pete is on administrative leave until 1 January 1992. Throughout this period, Pete continued to record and study the oral histories of former Alberta rangers in an attempt to better understand the historical development of protection policies in this province.

Dr. Hank Lewis, Department of Anthropology is currently on a McCalla Research Professorship and is working on two fire-related books and a number of major articles pertaining to wildland fire as part of this prestigious research award.

Dr. Ross Wein, Department of Botany and Forest Science continues his work on the effects of fire on nutrient budgets and plant succession. In addition, Ross is keenly interested in the effects of climate change and other disturbances on aforestaton. Dr. Wein has a number of joint studies with individuals from Ontario, England, B.C. and Japan. Ross is currently teaching our Advance Fire Ecology course, and continues as the Chief Editor of the International Journal of Wildlife Fire.

Dr. Paul Woodard, Department of Forest Science, continues his studies of the effects of fire on bighorn sheep, sharp-tailed grouse, and moose habitat. Currently, Paul is working with Dr. Joan Snyder of Grande Prairie Regional College on a lichen regeneration study to better understand the effects of timber harvesting and burning on these plants. Hopefully, this work will shed some light on how logging and fire effects mountain caribou. Also, Paul is working with Dr. Luigi Morgantini, an Adjunct Professor in the Department of Forest Science and local consultant, on a study that looks at the effects of timber harvesting on the establishment and maintenance of elk habitat in southern Alberta. Both of these studies are now in year-5 of 4-years.

Dr. Art Bailey, a Professor in the Department of Plant Science, has initiated a new study on the effects of fire and grazing only, and in combination on the dry aspen forests of central Alberta.

PUBLICATIONS.

Anderson, K. 1991. Models to predict lightning occurrence and frequency over Alberta. M.Sc. thesis, Univ. Alberta. Edmonton. 91 pp.

Samran, S. 1991. Ground fuel hydration in aspen stands of central Alberta. M.Sc. thesis, Univ. Alberta, Edmonton. 70 pp.

Kanjanakunchorn, S. 1992. The feasibility of using a garden-type soaker hose to contain wildland fire. M.Sc. thesis, Univ. Alberta, Edmonton. 58 pp.

Tymstra, C. 1991. Fire history of Yoho National Park, British Columbia and its implications for fire management. M.Sc. thesis, Univ. Alberta, Edmonton, 151 p.

Lewis, H.T. 1991. Technological complexity, ecological diversity, and fire regimes in northern Australia: Hunter-gather, cowboy, ranges. Pgs. 259-286. In Profiles in cultural evolution. A.T. Rambo and K. Gillogly (eds.). Anthropological Papers, Museum of Anthropology, Univ. of Michigan, No. 85. Ann Arbor, Michigan.

Lewis, H.T. 1991. The technology and ecology of nature's custodians: Anthropological perspectives on aborigines and national parks. In Conference on aboriginal involvement in national parks and protected areas. Johnstone Centre, Charles Stuart University - Murray, Albury, New South Wales.

Niederleitner, J., P.J. Murphy, and D. Quintilio. 1991. Wildland-urban forest fire potential and fuel reduction plan for Banff townsite and surrounding area. A final report for the Banff Park Warden Service.

Murphy, P.J., P.M. Woodard, D. Quintilio, and S.J. Titus. 1991. Exploratory analysis of the variables affecting initial attack hot-spotting containment rate. **Can. J. For. Res. 21: 540-544.**

Timoney, K.P. and R.W. Wein. 1991. The areal pattern of burned tree vegetation in the subarctic region of north western Canada. **Arctic 44: 223-230.**

Sabiiti, E.N., R.W. Wein and E.L. Adroma. 1991. Fire and browsing effects on the biology of East Africa Acacia species: a review. pp. 26-29. In Kayanja, F.I.B., and E.L. Edroma (eds.) African Wildlife: Research and Management. Internat. Council of Sci. Unions.

Wein, R.W., E.L. Edroma and K.G. Barr. 1990. Fire as a resource management tool in developing countries. pp. 292-298. In: Ghabbour, S.I. and M.A. Ayyad (eds.) The state of rural environment in development countries. Acad. Sci. Res. and Tech., Cairo, Egypt. 538 pp.

Hogenbirk, J.C., and R.W. Wein. 1991. A climate change hypothesis in a northern marsh. **Can. J. Bot. 69: 1991-1997.**

Johnson, A.F., P.M. Woodard, and S.J. Titus. 1990. Lodgepole pine and white spruce crowl fuel weights predicted from diameter at breat height. **For. Chron. 66: 596-599.**

Morgantini, L.E., D. Eslinger, and P.M. Woodard. 1988. Elk habitat improvement through timber harvesting in west central Alberta. Pages 170-175. In Proceedings of the 1988 Western States and Provinces Elk Workshop, Wenatchee, WA., 13-15 July 1988. M. Zahn, J. Pierce, and R. Johnson (eds.). 249 pp.

Kanjanakunchorn, S., P.M. Woodard, and H. McDonald. 1991. The garden-type soaker hose used "in series" to contain wildland fires. Pgs. 90-96. In 11th Conf. Fire For. Meteorology 16-19 April 1991. Missoula, Montana, USA. Soc. Amer. For. Publ., Bethesda, MD. USA.

Titus, S.J., W.S. Adams, and P.M. Woodard. 1991. Estimating white spruce and lodgepole pine residual fuel levels from typical timber inventory data with the Forester's workspace - a flexible microcomputer analysis environment. Pgs. 398-404. In 11th Conf. Fire For. Meteorology 16-19, 1991. Missoula, Montana, USA. Soc. Amer. For. Publ., Bethesda. MD. USA.

Rothwell, R.L., P.M. Woodard, and S. Samran. 1991. The effect of soil water on aspen litter moisture content. Pgs. 117-123. In 11th Conf. Fire For. Meteorology. 16-19 April 1991. Missoula, Montana, USA. Soc. Amer. For. Publ., Bethesda, MD. USA.

INVITED PRESENTATIONS.

Wein, R.W. 1991. An overview of the impact of climate change in northern ecosystems. (Keynote speaker.) International Symposium on Cold Region Development, Edmonton. June 17-21.

Wein, R.W., et al. 1991. Fire and the Arctic treeline. Land Surface Climate Processes Workshop. Nat. Hydrology Research Centre, Saskatoon. December 12-13.

Wein, R.W. 1991. University of Keele, U.K. Department of Biology. Climate change dynamics at the arctic treeline. November 29.

Wein, R.W. 1991. University of Keele, U.K. Biology Society. Environmental Issues in northern conservation. November 28.

Wein, R.W. 1991. Fire Command Team, training session, Canadian Parks Service. Fire Ecology of boreal ecosystems. April 17, at Forest Technology School in Hinton, Alberta.

Wein, R.W. 1991. Porcupine Caribou Management Board. Fire and caribou in northern Yukon. April 10.

Wein, R.W. 1991. University of Alberta, Department of Geography. Fire-climate change hypothesis for the north. March 26.

Wein, R.W. 1991. Forest Technology School, Hinton, Alberta. Prescribed burning research: a university perspective. Prescribed fire management in Alberta Workshop. February 26.

POSTERS PRESENTED.

Kanjanakunchorn, S., P.M. Woodard, and H. McDonald. 1991. The feasibility of using a common garden-type soaker hose to contain wildland fires. Univ. Alberta Forestry Res. Sym. 20 March 1991. Edmonton.

Morgantini, L., and P.M. Woodard. 1991. The effect of timber harvesting on elk and important forage plants in the foothills of Alberta. Univ. Alberta Forestry Res. Sym. 20 March 1991. Edmonton.

Samran, S., P.M. Woodard, and R.L. Rothwell. 1991. Effects of topographic position and soil water on aspen litter moisture content. Univ. of Alberta Forestry Res. Sym. 20 March 1991. Edmonton.

Vega Garcia, C., and P.M. Woodard. 1991. Modelling the spacial distribution of human-caused fires. Univ. Alberta Forestry Res. Sym. 20 March 1991. Edmonton.

Kanjanakunchorn, S., P.M. Woodard, and H. McDonald. 1991. The garden-type soaker hose used "in series" to contain wildland fires. 11th Conf. Fire For. Meteorology 16-19 April 1991. Missoula, Montana, USA.

Titus, S.J., W.S. Adams, and P.M. Woodard. 1991. Estimating white spruce and lodgepole pine residual fuel levels from typical timber inventory data with the Forester's workspace - a flexible microcomputer analysis environment. 11th Conf. Fire For. Meteorology 16-19 April 1991. Missoula, Montana, USA.

Rothwell, R.L., P.M. Woodard, and S. Samran. 1991. The effect of soil water on aspen litter moisture content. 11th Conf. Fire For. Meteorology. 16-19 April 1991. Missoula, Montana, USA.

Snyder, J.M., and P.M. Woodard. 1991. Lichen regeneration following fire and logging in west-central Alberta - a mountain caribou study. Univ. Alberta Forestry Res. Sym. 20 March 1991. Edmonton.

Snyder, J., and P. Woodard. 1991. Lichen regeneration following logging in caribou winter habitat in West Central Alberta. The Canadian Botanical Association and the Canadian Society of Plant Physiology. Joint Meeting 23-27 June 1991. Edmonton, AB., Canada.

Landhaeusser, S.M., and R.W. Wein. 1991. The Arctic treeline, fire and climate change. The Canadian Botanical Association and the Canadian Society of Plant Physiology. Joint Meeting 23-27 June 1991. Edmonton, AB., Canada.

Timoney, K.P., and R.W. Wein. 1991. Fire at the arctic forest-tundra boundary. Univ. Alberta Forestry Res. Sym. 20 March 1991. Edmonton.

Landhaeusser, S.M., and R.W. Wein. 1991. The arctic treeline, fire and climate change. Univ. Alberta Forestry Res. Sym. 20 March 1991. Edmonton.

Olsen, S.K. and R.W. Wein. "Fire severity and predicted arctic treeline composition: implications for climate change". The Third National Student Conf. on Northern Studies sponsored by the Assoc. Can. Univ. for Northern Studies.
(ACUNS), Ottawa - October 23-24, 1991.

Landhaeusser, S.M., and R.W. Wein. 1991. The arctic treeline, fire and climate change. The Inuvik Science Forum, July 27, 1991, Inuvik, N.W.T.

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School of Forestry
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December 20, 1991

Dr. P.M. Woodard
Department of Forest Science
Faculty of Agriculture and Forestry
University of Alberta
Edmonton, Alberta
T6G 2H1

Ref: Fire related activities at Lakehead University

During 1991, fire research activities by A.J. Kayll have continued with developing linkages of elements of the Canadian Forest Fire Danger Rating System to data collected while on sabbatical leave some years ago in the Republic of South Africa. A report has been forwarded to collaborators on characteristic fire behaviour in savannah-grassland ecosystems. A response is expected presently. Collaboration on these topics with academic colleagues in both Canada and South Africa is also underway.

Dr. Kayll has continued with his administrative responsibilities for the graduate program at Lakehead University as well as his teaching responsibilities in the technology, baccalaureate and graduate programs. A revised curriculum in the baccalaureate program has shifted the required fire management course into the final year. An innovative introduction of fire control topics in the first year field school (there are field school requirements in all years of the program) is therefore being considered for implementation in September, 1992.

The $4 million Ontario Ministry of Natural Resources' "Centre for Northern Forest Ecosystem Research" on campus has now been officially opened and increased collaboration with Ministry scientists dealing with forestry, wildlife and fisheries research topics is already underway.

A.J. Kayll, Ph.D., R.P.F.
Professor and Chairman, Forestry Graduate Studies

UNIVERSITÉ
LAVAL

FACULTÉ DE FORESTERIE
ET DE GÉOMATIQUE
Département des sciences forestières

Cité universitaire
Québec, Canada G1K 7P4

Ste-Foy, December 11nd., 1991

Dr. Paul M. Woodard
Department of Forest Science
Faculty of Agriculture and Forestry
University of Alberta
Edmonton (Alberta)
T6G 2H1

Dr. Woodard:

The Faculty of Forestry and Geomatic at Laval University has no research activity on forest fire management.

Forest fire management and science is taught in a required course: Forest Protection, along with entomology and pathology. Students receive 14 hours of lecture and have to submit a term paper on a subject related to forest fire. Teaching is done by an outside specialist hired for that purpose.

Truly yours,

Michel Dessureault

Dr. Michel Dessureault, directeur
Département des sciences forestières

MD/gb

FOREST FIRE MANAGEMENT ACTIVITIES

University of Toronto

1991

Exchange of Information Report to
Canadian Committee on Forest Fire Management
National Research Council of Canada

Submitted by: D.L. Martell

Research

Forest fire research efforts at the University of Toronto were focused on the following projects during 1991.

1. Air Tanker Deployment

D.L. Martell and A. Tithecott of the AFFMC of the Ontario Ministry of Natural Resources (OMNR) continued their work on a decision support system that can be used to help decide upon the daily deployment of airtankers in Ontario. We conducted a field test of our prototype queueing model at the Dryden fire centre during the 1991 fire season. We identified a number of improvements and model enhancements that will be incorporated in a revised version of the model and field tested during the 1992 fire season. This work is supported by the Natural Sciences and Engineering Research Council of Canada (NSERC) and the OMNR.

D.L. Martell and J. MacLellan (graduate student) have initiated research on the development of decision support systems for strategic planning of airtanker operations. We have developed a preliminary version of a dynamic fleet composition model (e.g., when to purchase new airtankers and/or retrofit existing aircraft) which will eventually be expanded to address home-basing decisions. This work is supported by NSERC and the OMNR.

2. The Impact of Fire on Timber Supply

D.L. Martell and D. Boychuk (graduate student) continued their work on the impact of fire on timber supply. D. Martell documented his work on the impact of fire on timber supply in Ontario. D. Boychuk developed new models that can be used to incorporate probabilistic fire losses in forest management planning procedures and used them to explore how random fire losses effect long term timber management planning. This work is supported by Forestry Canada, the OMNR, NSERC, and the Ontario Graduate Scholarship Program.

Publications and Presentations

Martell, D.L., and A. Tithecott. 1991. Development of daily airtanker deployment models. Paper presented at the Symposium on Systems Analysis in Forest Resources. March 3-7, 1991. Charleston, South Carolina.

Martell, D.L. 1991. Potential applications of mathematical programming to forest management planning in Ontario. Paper Presented at the Ontario Forestry Research Committee Symposium. North Bay, Ontario. October 30, 1991.

B.C. COUNCIL OF FOREST INDUSTRIES

B.C. COUNCIL OF FOREST INDUSTRIES

Exchange of Information

Canadian Committee on Forest Fire Management
Ottawa 1991

Council of Forest Industries Report

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1. General Fire Situation and Statistics

   Fire problems were the lowest in many years due to the late summer and reduced operational activities. The few fires that occurred were suppressed quickly with little damage and cost.

   One fire was significant due to the loss of a fire fighter's life.

2. Aircraft Utilization

   Very low flying hours were recorded by Forest Industries Flying Tankers Ltd. (see attachment).

3. Equipment Development and Testing

   A new, heavy equipment, foam fire extinguisher is being developed and tested. The project should be completed in 1992.

4. Prescribed Burning

   The weather was good for prescribed, broadcast burning this year. Due to many factors, prescribed fire needs are less and, therefore, there is less burning. Most planned areas were burned.

5. Organization Changes

   Due to poor markets, industry is cutting back in all cost areas. Fire management and forest protection is not exempt from cutbacks. Industry will depend on Provincial Forest Service's fire fighting cooperation more than before to help keep fire damage low.

[illegible]
December 17, 1991

AIRCRAFT UTILIZATION REPORT FIFT

1. Fixed Wing

Air Craft Type	No.	Hours Bombing	Litres Dropped Ret./Foam/Water
JRM Mars	2	17.6 Contract: Casual	0/1,036,500/163,600

Subtotal Hours: 17.6 Litres

Foam 1,036,500
Long Term 0
Water ~~Short Term~~ 163,600

Total 1,200,100

2. Rotary Wing

Aircraft Type	No.	Hours Bombing Contract + Casual	Litres Dropped Retardant/Foam/ Water
B 206L1	3	52.0	0/300,000/0

Subtotal Hours: 52.0 Litres

0 Water
300,000 Foam
0 Ret. Long Term
0 Ret. Short Term

Total 300,000

TOTAL HOURS FLOWN

Fixed Wing 17.6
Rotary Wing 52.0

GRAND TOTAL 69.6

TOTAL LITRES

Water 163,000
Foam 1,336,500
Long Term 0
Short Term 0

1,499,500

Comments: Slowest and least active fire season on record.

Research Status or Completion Report

Agency: MacMillan Bloedel Ltd.
Woodlands Services Div.

Date: November 7, 1991

Title: Effects of Prescribed Burning on Forest Productivity of Some Coastal B.C. Sites

Key Words:

Fire effects, prescribed burning, long-term productivity, soil nutrients, tree growth response.

Current Year Resources:

Person Years: 0.25

Funding: MB/Forestry Canada

Timetable:

Starting Date: 1985

Completion Date: 1992

Objective:

To improve our understanding of the effects of prescribed fire on soils, vegetation and tree growth over a range of fire intensities.

Work Done:

Pre- and post-burn site monitoring; annual erosion, tree growth and vegetation monitoring (5-years) completed in Fall 1990; analysis of short-term impacts.

Reports and Other Data Available:

Canada/B.C. Forest Resource Development Agreement (F-52-31-002) FRDA, Report on fire impacts and 3rd year tree growth response. November 1990.

Project Leader: William J. Beese

Year: 1991

mM-1112

Research, Development and Technology Transfer Needs

Agency: Industry
COFI

Date: January 1992

Title or Area of Need: Quantitative Evaluation of Enhanced Water Fire Suppression for Wildland and Urban Interface Fire

Priority: (Check One)

High ☒ **Medium** ☐ **Low** ☐

Background:

1) Whereas, traditional plain water is ineffective,
2) Whereas, experience with Class A Foam indicates it is highly effective,
3) Whereas, little is known of the mechanism of Class A Foam fire suppression and the optimum suppression technique and rate of application,
4) Whereas, economic and resource losses will likely be significantly reduced if advanced technology is adopted in fire control.

Proposal or Recommendation:

1) Now therefore be it resolved, that research immediately commence to quantitatively evaluate Class A foam fire suppressants for the wildland and urban firefighter.
2) Now therefore be it resolved, to direct resolution to Ministry of Forests, Provincial Attorney General's Office.

Research, Development and Technology Transfer Needs

Agency: Industry
COFI

Date: January 1992

Title or Area of Need: Means, Procedures for Economically evaluation fire management efforts at industry and government level.

Priority: (Check One)

High ☐ **Medium** ☒ **Low** ☐

Background:

1) Fire suppression budgets are often determined by "scare tactics" or the "fright syndrome" instead of cost benefit analysis.
2) A cost benefit analysis specifically for fire management would help managers plan and obtain funding for legitimate projects (non-political).
3) It might also prove or disprove current practices.

Proposal or Recommendation:

1) Develop a computerized fire management cost benefit program which can be used with GIS or equivalent technology.

Research, Development and Technology Transfer Needs

Agency: Industry
COFI

Date: January 1992

Title or Area of Need: Fire Prevention Program and Evaluation

Priority: (Check One)

High ☐ **Medium** ☒ **Low** ☐

Background:

1) Fire prevention budgets in most jurisdictions are less than 1% of fire management budgets.
2) Traditional fire prevention items in Canada are expensive due to cross border taxes and handling charges.
3) Evaluating fire prevention effort is not an exact science, nor is it often done.
4) It has been more than 10 years since CCFFM has sponsored a fire prevention seminar.

Proposal or Recommendation:

1) A standard system of fire prevention evaluation and cost benefit be developed.
2) Sponsor a resolution to Canada and USA to drop all duties and taxes on fire prevention.
3) Sponsor a fire prevention seminar or ensure high tech fire prevention is included in all fire related seminars in Canada.

RM-1107

SECTION II

SPECIAL REPORTS

FOREST FIRE EQUIPMENT WORKING GROUP

FOREST FIRE EQUIPMENT WORKING GROUP

MINUTES
Joint Meeting of the
CCFFM Forest Fire Equipment Working Group
and
NWCG Fire Equipment Working Team

Halifax, Nova Scotia
Sept. 25 - Sept. 28, 1991

Wayne Martin opened the meeting at 8:30 am and introduced Bob Joens FEWT Co-Chairman for the meeting. Mr. Ed McAuley, Director Forest Protection with the Nova Scotia Department of Natural Resources was then introduced and he welcomed the group on behalf of the host agency. Housekeeping items were covered along with an overview of the weeks activities. Topics discussed at the meeting were as follows:

FEWT and FFEWG UPDATES

Bob Joens reported on the activities of the FEWT for the current year. Five sub-committees have been established and are chaired as follows. Doc Smith - Foam; Bill Williams - F.L.E.; Gordon Foster - Water Handling; Brian Hutchings - National Engine Study and Pat Kelly - NFES.

Major accomplishments during the year include:

- Equipment refurbishing standards finalized.
- Cache computer system will be operational by Feb. 1992.
- 7500 copies of foam newsletter completed.
- "Foam vs Fire" draft completed.
- Two foam videos completed, 5 more in progress.
- Progress on international wildland foam standard.
- FLE position standards and qualifications established, video in progress.
- National engine study group working on standardized wildland engine request for proposal content and "Guide for Selection Engine Components."

Wayne Martin reported that the Canadian Committee has undergone major restructuring during the past year. Other than to indicate the process is now nearing completion no other details were presented. Canadian forest fire activities and accomplishments were reported in agenda item topics as the meeting progressed.

FOAM TASK GROUP

Doc Smith reported that the group has not met since the last FEWT meeting and a meeting is planned for the end of October in Grand Rapids, Minnesota. Volume 4, Issue No. 1 of the foam newsletter which was published and funded jointly by the CCFFM and Forestry Canada has just been released. Mr. Smith noted that there is a real need for additional material for the newsletter as some redundancy is now occurring. The publication will continue but it may shrink in size and/or frequency.

The second foam video "Properties of Foam" was completed, reviewed and approved by the F.E.W.T. Five more videos are planned but they are expensive. A video on proportioners will be ready for review in December and one on nozzles is about 50% complete. Also to be completed is a video on CAFS and one on tactical use of foam.

The "Foam vs Fire" publication is nearing completion. This will be forwarded to SDTDC for typesetting by October 15 following a final edit by Chuck George. Money allocated to produce a camera ready copy of the publication in fiscal year 91 has apparently been used elsewhere. Despite this it is hoped the project will be completed this year. Two additional publications are planned for 1992: "The Foam Primer" an abstract of "Foam vs Fire" and "A Comprehensive Guide to Aviation Application of Foam".

PNFI WILDLAND FOAM EQUIPMENT - EVALUATIONS

Doug Higgins reported that Petawawa National Forestry Institute is evaluating the effectiveness and cost of using various commercially available educators and proportioners. Preliminary figures indicate that proportioners can pay for themselves very quickly by saving on the amount of foam concentrate used.

FIRELINE EXPLOSIVES

Bill Williams reported on the status of the Fireline Explosives Subcommittee. Job descriptions for the three levels of blasters are now complete. Work on an I.C.S. course is approximately 2/3 finalized and should be completed by November. Work is also being done on a two hour unit to add to the command course. A storybook for a video was completed last spring but due to limited activity this fire season no filming was done this year.

Product certification work is continuing and to date only two products are certified. Work is also progressing on an emulsion type product which is cheaper and lighter. NFES will soon be offering a detonator and a blasters kit. The next subcommittee meeting will be held at SeaTac Airport on Nov. 12 - 14, 1991.

INTERNATIONAL WILDLAND FOAM STANDARD

Gordon Ramsey and Chuck George reported on international foam standards work. The IFSL does the analysis of concentrate samples. Problems have developed since the Free Trade Agreement between Canada and the U.S. and some brands of foam concentrate have different compositions on each side of the border even though they are marketed as the same product. Resolution will not be simple. It was agreed that foam products will be monitored closely and periodic analysis of similiar name products would be completed as required.

A meeting of the Wildland Foam Standard Steering Group is planned for February at ISFL, Missoula, Montana to address the requirements for an international foam standard. Through a Canada wide survey significant input has been provided by Canadian users.

FIRE STOP III - A PROPOSAL FOR JOINT PARTICIPATION

Jack Weist of the California Department of Forestry presented a proposal for Fire Stop III which is planned for 1995. The Firestop initiative was started some 37 years ago as a research program in cooperation with several vendors. The first session was held in 1955 and considerable progress was made at developing air tanker tactics. A second session was held in 1989.

For 1995 the C.D.F. is proposing a joint session with the C.D.F. as chair and F.E.W.T. and C.C.F.F.M. as supporting participants. A worldwide involvement is being suggested. Gord Ramsey will present the proposal to the C.C.F.F.M. at the annual meeting in January, 1992. Mr. Weist suggested that Canadians be included on the evaluation panels and further suggested that Canadian suppliers be invited to be part of the program. See Appendix A.

SDTCD, MTDC, BIFC & CIFFC REPORTS

Paul Hill, SDTDC, gave a brief overview of the centers activities and organization. A handout highlighted the major projects under Mr. Hill's Fire Management Program and the Aviation Program Division.

Jim Stump, BLM, F & A M gave a report on BLM, BIFC activities. His report included a brief overview of their organization. He also noted that Bob Webber is in a new position which involves developing production rates.

Dick Mangan briefed the group on MTDC programs. MTDC is responsible for Fireline Explosive (FLE) certification, health hazards of smoke, fire shelters and various equipment development. They also have three staff members representing FEWT interests with NFPA which is currently developing standards for wildlands PPF and equipment.

Tom Johnston of CIFFC reported on wildfire co-ordination and activities in Canada. On average only about 5% of Canadian agency fires occur in "observation areas" however, these few fires account for 50% of the area burned. In 1991 Canada experienced an average year with most of the more serious fire activity occurring in Eastern Canada. Movement of personnel fireline equipment and airtankers kept staff at the center busy during peak periods. A copy of the CIFFC report is included in Appendix B.

NOVA SCOTIA FIRE MANAGEMENT PROGRAM

A field trip to the Department of Natural Resources headquarters at Shubenacadie was arranged for Thursday afternoon. The trip was sponsored by the Department of Lands & Forests and equipment/supply vendors. A tour of the aviation, dispatch, fire operation center and maintenance facility was provided by Mr. Robert Matheson, Supervisor Forest Fire Protection. Following this several demonstrations of new or improved technology were presented by various vendors. These ranged from helicopter deployable pump modules and remote monitors to mini portable pumps and command shelters.

PROPOSAL FOR INTERNATIONAL STUDY FOR EQUIPMENT AND CREW FIRELINE PRODUCTION RATES

Chuck George presented a proposal for an international study on equipment and crew fireline production rates. A consultant has submitted a study proposal for review. The Canadian contingent agreed that standardization of production rates is preferred and will evaluate the proposal to determine what they can contribute.

DIRECTORY OF FOREST FIRE EQUIPMENT PERSONNEL

The directory of forest fire equipment personnel was to be distributed last year. Brian Hutchings advised the group that the directory was submitted to PMS for publishing, however, the document was not distributed to all members. A copy was circulated for any changes and will be resubmitted to PMS. Gord Ramsey will circulate to Canadian agencies.

NEW EQUIPMENT DEVELOPMENT

A body cooling suit was demonstrated at the meeting. The suit is designed to cool the body and reduce the probability of heat stress when working near high temperatures. The system is comprised of a pump, batteries, hose, circulating cool water and temperature regulation. From a health and safety perspective the body cooling suit appears to have potential and the FFEWG will continue to monitor developments in this area.

As part of the field trip to Shubenacadie, Helitactics Ltd. demonstrated a Helicopter Deployable Pumping System. The system is comprised of a large diameter hose, helicopter deployable boat, pump, hose and remote controlled nozzles. This new suppression technique appears to have potential in some fire suppression applications.

FIRE CHEMICALS - A NEED FOR INTERNATIONAL STANDARDS

Gord Ramsey led a discussion on the need for international standards for fire chemicals. Same name chemicals on both sides of the border are not necessarily the same formulations. Standards need to be developed which will ensure same name products on both sides of the border have the same chemical composition. It was noted that in Canada the CCFFM can only recommend standards, they do not have the authority to mandate them. The FFEWG will continue to work with the FEWT in recommending the development of appropriate standards.

IVORY COAST FIRE MANAGEMENT - PROGRAM

Gaston Guay gave an interesting slide/talk presentation on a three year project in the Ivory Coast, Africa. Mr. Guay assisted fire people in that country in fire management principals and suppression techniques.

CANADIAN COMMITTEE ON FOREST FIRE MANAGEMENT
RESEARCH AND TECHNOLOGY TRANSFER SUBCOMMITTEE
FOREST FIRE EQUIPMENT WORKING GROUP

1. REVIEW OF FFEWG "TERMS OF REFERENCE"

Mr. Ed MacAuley, sitting in for Mr. Dan McAskill as CCFFM liaison representative led the discussion on this topic. In light of changes in the structure and funding of the CCFFM and the resignation of the permanent co-ordinator/chairman of the Forest Fire Equipment Working Group Mr. MacAuley outlined the need to reassess the role and structure of the FFEWG committee.

Following considerable discussion the following organization and structure is being proposed.

PROPOSED ORGANIZATION AND STRUCTURE

(i) Committee Name

Forest Fire Equipment Working Group (FFEWG)

(ii) Chairman

- To be selected from the attached rotation, host province or territory
- To hold position for one year (April 1st to March 31st)
- To chair the Annual Meeting of FFEWG and host same if in Canada
- To provide the secretary for the Annual Meeting and produce the minutes
- To assist in development of a proposed work plan to be approved at the Annual Meeting of CCFFM
- To attend the Annual Meeting of CCFFM with the Co-ordinator to present the work plan for approval.

Co-ordinator

- To be Forestry Canada employee
- To ensure continuity co-ordinator will be permanent
- To represent working group at other National and International Meetings
- To ensure National Program co-ordination and technical standard
- To assist Chairman in organizing Annual Meetings
- To assist Chairman in production of proposed work plan
- To attend the Annual Meeting of CCFFM with Chairman to present the work plan for approval.

(iii) Membership

Membership on the FFEWG will be regional and comprised of representatives from the following agencies:

1. BC-YT
2. ONT
3. SASK-MAN
4. QUE
5. ALTA-NWT
6. NFLD-NS-NB-PEI
7. PNFI, FC
8. CIFFC
9. FEWT/USA (Advisor)
10. Canadian Parks Service

(iv) Meeting Rotation

Meetings will be rotated from west to east as follows:

1. BC - YT
2. ONT
3. SASK - MAN
4. QUE
5. ALTA - NWT
6. NFLD - NB - NS - PEI
7. PNFI, FC
8. Parks Canada

The Terms of Reference for the FFEWG were also reviewed. With the exception of some minor changes the Terms of Reference proposed for the FFEWG are as follows:

TERMS OF REFERENCE

1. To provide a forum for exchange of information on research and development of forest fire equipment and related products.

2. To develop work plans for specific tasks either as identified by FFEWG or CCFFM.

3. To liaison with the United States National Wildfire Co-ordinating Group, Fire Equipment Working Team and other relevant international fire equipment agencies.

4. To promote increased technology transfer and communication among fire management agencies on fire equipment issues through publications, workshops, seminars, etc.

5. To develop and upgrade specifications for National Forest Fire Equipment and related products.

6. To present the annual report of the working group and recommend the work plan to CCFFM at their Annual Meeting.

2. NATIONAL ADVANCED RESOURCE TECHNOLOGY CENTER INTERNATIONAL FIRE MANAGEMENT TRAINING

Bill Shenk Co-ordinator of the National Advanced Resource Technology Center in Marana, Arizona provided insight into the facility, staff, natural resource and fire management courses available at the center. Mr. Shenk indicated that the role of NARTC is to manage, develop and conduct National Technology transfer sessions in the field of Fire & Aviation Management , Air Quality, Minerals Management, Lands Administration, Watershed Management and International Training Support. In summary NARTC's role is to extend national level training expertise and opportunities to the various wildland management agencies in the United States and to add support to International Fire Training.

In regard to the latter Mr. Shenk advised the FFEWG that in addition to courses already available the Center would be prepared to develop and design courses around Canadian agencies specific needs. A number of Canadian fire agencies have already sent participants to NARTC for various courses and the response from these agencies toward the quality of the courses have been excellent.

3. O.M.N.R. Q.C. CONVERSION PROGRAM AND THE NEED FOR NATIONAL SPECIFICATION TESTING

In 1991 the Aviation & Fire Management Branch of the Ontario Ministry of Natural Resources converted all threaded hose coupling to the quick connect type. Mr. Reider Vollebekk indicated that Ontario went with quick connect couplings to ensure compatibility with other agencies when exchanging hose and for the advantages that quick connect offers over threaded.

Involved in the process was the conversion of 33000 lenghts of hose, the repacking of 1300 pump tool kits and 100 sprinkler kits and the placing of adapters on various items in 177 service kits. In addition to Aviation and Fire Management, other agencies including industry, municipal fire departments, railways, tourist/outfitter camps, cottage associations, Ontario Hydro Pipeline, Indian Reserves and Parks Canada were affected by the conversion.

Mr. Vollebekk indicated that Ontario selected the ULC forged national standard coupling endorsed by the CCFFM and CIFFC. The tender proposal required that couplings had to be ULC listed, labelled and meet all requirements of the standard. The total cost of the hardware was $458,495.68 with Ontario having to provide Angus with 30,000 sets of brass threaded couplings.

With the exception of some minor problems the conversion went well and fireline personnal are extremely happy with the quick connect concept and the quality of the coupling.

Through the process of converting to quick connect in Ontario, a number of situations arose which clearly identified the need for National Specification Testing. Mr. Vollebekk pointed out that there is now much more movement of resources among fire agencies then ever before and the need for a standard which guarantees a certain quality is more important then ever.

4. EQUIPMENT NEEDS SURVEY

As part of the 1990 work plan an equipment needs survey was completed by all agencies. Mr. Klaus Barth was assigned the task of compiling the data and the results were presented at the meeting. Due to the format of the survey it was difficult to determine overall equipment need priorities across the country. A suggestion was made that it may be more appropriate to establish equipment needs based on Regions.

In the end it was agreed that a new survey format will be drafted and another attempt made to determine equipment need priorities.

5. EQUIPMENT DEVELOPMENT MARKETING PROGRAM - BRITISH COLUMBIA

British Columbia's Equipment Development Marketing Program was explained by Steve Grimaldi. In an effort to develop fire equipment which meet the needs of wildland firefighters, the BCFS, in conjunction with British Columbia manufacturers have made changes to equipment or developed new products. This system has resulted in the company having a proven product and acquiring the rights to it while the Minister can purchase the product at single source prices. In addition to working with manufacturers in developing products the Protection Branch has begun a program to develop its own product for fire suppression work. These products are specialized, not available on the public market and are developed by firefighters for firefighters. If the private sector expresses interest in any of the products they can acquire a licence for the marketing of them through the Supplier Development Section of the British Columbia Purchasing Commission. The Minister, however, always retains the proprietary right thereby ensuring the best cost to Government.

The advantages of the Equipment Development Marketing Program to the BCFS are twofold - products are developed which meet the needs of firefighters and the cost savings to government is substantial.

6. NEW BRUNSWICK WILDLAND FOAM INITIATIVES

New Brunswick initiatives in applying foam technology and equipment to their ground operation was presented by Mr. K. Barth. Twenty-one of New Brunswick's sixty-six tankers have been retrofitted using discharge side proportioners. A prototype proportioner has been developed which shows promising results. The technology is based on waterflow in the hose line. Cleanliness of the water is of little or no consequence since the foam percentage is directly proportional to the flowrate of the water.

Plans are to continue to retrofit the remaining tankers. As retrofits are completed and tankers re-assigned to their base of operation, training sessions for field staff are conducted as an integral part of the retrofit.

7. NATIONAL EQUIPMENT STANDARDS

Doug Higgins, P.N.F.I presented an update on national standards for forestry hose and external lug quick connect couplings. Standards for percolating forestry hose ULC - S519M and non percolating hose ULC - S518M have been finalized and copies will be circulated to CCFFM members early in 1992.

The proposed printing of the Second Edition of "Standard for External Lug Quick Connect Couplings and Adaptors for Forestry Fire Hose CAN/ULC S551-M-86" has been deferred until the ULC Coupling Sub-Committee has investigated tests performed at ULC regarding immersion testing. A meeting of the ULC Hose Coupling Sub-Committee will be scheduled for February to complete the standard. At this meeting the ULC will also initiate work on the proposed synthetic forestry fire hose standards.

8. FIRELINE EXPLOSIVES

Bill Williams provided an update to FFEWG members on the latest development in the Fireline Explosives program. A permanent task group has been formed to address all issues dealing with safety, handling tactics etc. of using fireline explosives. Mr. Williams thought it would be a good idea to have someone from Canadian agencies participate on the task group.

The task group met once in Boise in December 1990 and a small training group met once in Coeur O'Alene. The following has been accomplished:

- Qualifications and certification system for three I.C.S positions dealing with explosives have been drafted.
- Working on I.C.S course for FLE personnel and video to be used with FLE training program.
- A blasters handbook has been published which is available upon request.

9. AGENCY UPDATES

Agency updates were presented by FFEWG members at the meeting. Presentation by non attending members were tabled and are included in Appendix B.

Canadian Committee on Forest Fire Management
Forest Fire Equipment Working Group
Proposed Work Plan - 1992

TOPIC	DISCUSSION	ACTION	TIME
FFEWG INITIATIVES			
1) National Technology and Development Centre	It was recommended that there was a strong requirement for a National Technology and Development Centre. The purpose of the Centre would be to undertake a wide range of equipment evaluation, development and specification certification as well as coordinate the individual agency test program among Canadian Fire Management Agencies and between Canada and the United States. Forestry Canada, PNFI presently support a program with the mandate to undertake the above at a reduced level.	The CCFFM felt that the idea is a good one and all would benefit from such a centre. Many factors must be considered prior to any recommendations and the CCFFM has taken this recommendation under advisement.	Awaiting decision from Executive of CCFFM.
2) Personnel protective gear	A survey on "Personal Protective Gear" has been undertaken by both FFEWG and CIFFC, RMWG. Information from the NFPA and the various WCB's in Canada has been gathered. A preliminary report was prepared for discussion at the 1990 CCFFM Annual Meeting. Presently all Fire Management agencies maintain their own standards and for the present they have decided not to pursue Canada - wide standardization in the area of fire fighting protective clothing.	NFPA are in process of developing standards for wildfire protective clothing and other protective gear. FEWT is working with the USDA Forest Service, MTDC on the NFPA committee and will ensure that FFEWG members remain informed. FFEWG will continue to monitor developments in this area.	Ongoing

TOPIC	DISCUSSION	ACTION	TIME
3) Underwriters' Laboratories of Canada, National Hose and Coupling Standards	Standards for percolating forestry hose - ULC-S519M and non-percolating hose - ULC-S518M have been finalized and distributed effective Nov. 29, 1992. The proposed printing of the Second Edition of "Standard for External-Lug Quick Connect Couplings and Adaptors for Forestry Fire Hose, CAN/ULC S551-M86 has been deferred until the ULC Coupling Subcommittee has investigated tests performed at ULC regarding immersion testing.	Hose Standards, ULC-S519M and ULC-S518M will be distributed to FFES members when available. A meeting of the ULC Hose Coupling Subcommittee will be scheduled for February 1992 to complete the standard. On the same dates the ULC Forestry Fire Hose Subcommittee will initiate work on the proposed synthetic forestry fire hose standards. R. Vollebekk, K. Barth, D. Higgins, G. Ramsey, S. Grimaldi Note: In order to ensure receipt of National Standard forged type couplings tenders should specify that couplings be ULC listed and also meet all the requirements of ULC Standard CAN/ULC S551-M-86. If not specified you may receive a cast type coupling.	Ongoing
4) NRC, Associate Committee on Forest Fire Protection (ACFFP) Ordering Descriptions Note: ACFFP is now CCFFM	ACFFP Ordering Descriptions provide specifications requirements for 17 fireline accessory items. The descriptions are to be upgraded for use in 1992. PNFI will screen for standard reference correctness and several agencies will share the task of upgrading to current requirements.	R. Vollebekk. G. Conacher S. Grimaldi, William Mawdsley D. Higgins, W. Martin Members of the FFEWG have been assigned Ordering Description items to complete and to date several have have been finalized and circulated for review. B. Buck has agreed to undertake the task of formalizing the description in final format.	Sept 1992
5) Fire Equipment Standards	Standards for the Pulaski, Fire Shovel, Fire Axe and Fire Rake were completed and presented to the CIFFC Resource Management Working Group for implementation in 1989. The	Proposed amendments (metal hardness) to the standards will be addressed at the 1992 meeting. All equipment requiring national standards will be identified at the meeting.	Sept 1992

TOPIC	DISCUSSION	ACTION	TIME
	standards require review due to concerns expressed by industry on meeting some of the requirements contained within the documents.		
6) Equipment Needs Survey	An Equipment Needs Survey was completed by all agencies. However due to the format of the survey it was difficult to determine fire equipment need priorities across the country. It was agreed that the present format required revision prior to continuing the process to determine forest fire equipment need priorities.	Guidelines for a revised Equipment Needs Survey will be developed during the winter. Another survey will be undertaken to determine equipment needs. Results will be discussed at the 1992 meeting. S. Grimaldi, R. Vollebekk - (Survey Format)	April 1992
7) Smoke Signals/ Signaux de Fumee	A sufficient number of appropriate articles have been obtained and are in the final phase of editing. Articles for the fifth edition are being collected.	G. Ramsey, D. Higgins, G. Guay and F. Larocque	April 1992
8) FFEWG Membership	As approved by the CCFFM the membership of the FFEWG is as follows: Steve Grimaldi, BCFS/Yukon William Mawdsley, Alta./NWT Glenn Conacher, Man./Sask. Reider Vollebekk, Ont. Fernand Larocque, Que. Wayne Martin, Atlantic/Maritimes Tom Johnston, CIFFC Gordon Ramsey, FC Bob Joens, FEWT		
9) "Foam Applications for Wildland and Urban Fire Management", Newsletter	The Foam Applications publication continues to be an efficient vehicle for exchanging timely information on matters dealing with wildland foam.	It was recommended that Canada accept the responsibility every 2 to 3 years to publish an issue of the "Foam Applications" newsletter.	As required

TOPIC	DISCUSSION	ACTION	TIME
	The project undertaken by the NWCG, FEWT, Foam Task Group and supported by the CCFFM, FFEWG and Forestry Canada now publishes three issues annually. The FFEWG and PNFI accepted the responsiblity for funding and publishing Vol 4, No 1 in August 1991. The CCFFM contributed $2000.00 toward the publishing costs of $3200.00 for printing 7500 copies. Mailing list distribution costs of $1400.00 were also funded by PNFI. Approximately 500 copies were distributed throughout Canada and several thousand throughout the United States and other countries.	In order for the publication to remain viable, personnel from each Canadian fire management agency must be encouraged to submit articles for inclusion in the publication. It is recommended that the FFEWG accept the responsibility for funding and publishing the Foam Newsletter on a 2 or 3 year cycle. G. Ramsey to coordinate Canadian input and be responsible for distribution in Canada.	As required
10) Fire Stop III 1995, International Evaluation of Wildland Fire Suppresion Technology for the 21st Century	Fire Stop III has been scheduled to be held in California in 1995. Jack Wiest, Staff Chief, Fire Planning, Research and Cooperative Fire, California Department of Forestry (CDF) attended the September Joint Meeting in Halifax and presented the formal proposal (see minutes) inviting CCFFM, FFEWG and Forestry Canada to be co-sponsors with NWCG, FEWT and CDF of Fire Stop III. Forestry Canada (PNFI) has proposed the allocation of $50,000 through the Green Plan Program. The money will primarily be used to support evaluation team members (FFEWG) from Canada. A Steering Committee is being formed and will consist of Jack Wiest, Chairman, CFD, Bob Joens, NWCG, FFWT and a Canadian representative.	The Steering Committee will meet in February 1992 at Sacramento, Ca. to formulate plans for Fire Stop III. It was recommended that G. Ramsey represent the CCFFM, FFEWG on the Steering Committee and coordinate Canadian input into the program.	1991-1995

TOPIC	DISCUSSION	ACTION	TIME
11) Joint equipment evaulations FEWT and FFEWG	FEWT and FFEWG agreed upon the merit of exchanging prototype equipment and products for the purpose of evaluation and accreditation. The procedure may result in the earlier adoption of useful equipment or products by fire management agencies.	The exchange of prototype equipment will be faciliated through R. Joens and G. Ramsey	As required.
12) Facility sharing Canada/United States	The USDA, Forest Service support specialized technology and development centres - San Dimas Technology and Development Center and Missoula Technology and Development Center. The Centers undertake a variety of specialized qualification tests on a wide range of equipment as well as the development of new fire suppression related technology. The cooperative use of these facilities and others would be of significant value.	Arrangement for tests will be coordinated through R. Joens and G. Ramsey	As required.
13) Joint Meetings of the CCFFM, FFEWG and the NWCG, FEWT.	The liasion between the CCFFM, FFEWG and the NWCG, FEWT has proven most beneficial over the years. Many positive results have been obtained through the Joint Meetings held at Gander, NF; Abbotsford, B.C.; Quebec City, Que.; San Dimas, Ca.; and Halifax N.S. The continuation of holding joint meetings every two years has been highly recommended by both Committees.	The next joint meeting of the CCFFM FFEWG and NWCG, FEWT is scheduled to be held in the United States in 1993. R. Joens and G. Ramsey will coordinate the program with respect to the date and location.	Sept. 1993
14) Directory of Forest Fire Equipment Personnel	The latest update was presented at the September Joint Meeting held at Halifax, Nova Scotia.	B. Hutchins and R. Vollebekk will prepare and distribute the current issue and arrange for update on a two year cycle.	Dec. 1991

TOPIC	DISCUSSION	ACTION	TIME
15) Coordinating groups for special projects	It was agreed by FEWT and FFEWG (San Dimas, Oct. 1989) that cooperation on major equipment development evaluation programs would be beneficial in order to reduce a significant duplication of effort (i.e. Tasmania Laser Ignition Device). The duplication of effort can be reduced significantly through increased communication between the two committees.	Communication on special projects will be coordinated through R. Joens and G. Ramsey.	As required.
16) FFEWG, 1992 Annual Meeting	In keeping with the structrue and terms of reference the next meeting of the FFEWG will be held in Whitehorse, Yukon Territory.	Dick Seaman, Incoming Chairman Gord Ramsey, Co-ordinator	Sept. 1992

Prepared by
W. S. Martin, Chairman, FFEWG
G. S. Ramsey, Co-ordinator, FFEWG

USDI BUREAU OF LAND MANAGEMENT RESEARCH ACTIVITIES

- IMAS & INCINET -

INITIAL ATTACK MANAGEMENT SYSTEM

INTRODUCTION/BACKGROUND:

- * IAMS PROJECT INITIATED IN THE "LOWER 48" IN 1982
- * CONCEPT CARRIED TO ALASKA SHORTLY THEREAFTER
- * IAMS' GOAL IS THE REDUCTION OF FIRE SUPPRESSION COSTS BY KEEPING 50% OF FIRES AT 10 ACRES OR LESS
- * INTEGRATES THE AUTOMATIC LIGHTNING DETECTION SYSTEM (ALDS) and THE REMOTE AUTOMATIC WEATHER STATION (RAWS) SYSTEM WITH ALL NECESSARY INFORMATION FOR INITIAL ATTACK FIRE OPERATIONS
- * PLACED REMOTE INTERACTIVE GRAPHICS SYSTEMS (RIGS) IN ALL BLM FIRE DISPATCH OFFICES

INITIAL ATTACK MANAGEMENT SYSTEM

PROVIDES:

- REAL TIME DISTRIBUTION AND DISPLAY OF THE BLM'S AUTOMATIC LIGHTNING DETECTION SYSTEM (ALDS) DATA
- REAL TIME DISTRIBUTION OF REMOTE AUTOMATIC WEATHER STATION (RAWS) DATA
- DISPLAY PLATFORM FOR GEOGRAPHIC INFORMATION (MAPS)
- DIRECT ACCESS TO BLM-WIDE TERRAIN and FIRE FUELS DATA BASES
- DIRECT ACCESS TO FIRE MANAGEMENT COMPUTER PROGRAMS AND FIRE MODELING PROGRAMS
- COLLECTION and DISTRIBUTION OF FIRE STATUS INFORMATION
- CENTRALIZED CONNECTION TO AFFIRMS
- ELECTRONIC MAIL FACILITY BETWEEN ALL BLM FIRE MANAGEMENT/FIRE DISPATCH OFFICES AND THE U.S. FOREST SERVICE DATA GENERAL SYSTEM

THE BASE IAMS PROJECT:

- RESULTED FROM THE LACK OF SYSTEM CAPACITY and CAPABILITIES ON THE PART OF THE REMOTE INTERACTIVE GRAPHICS SYSTEMS (RIGS) TO MEET EVER INCREASING USER NEEDS
- WAS SANCTIONED AS AN UPGRADE INITIATIVE IN 1989
- WAS SEEN AS AN OPPORTUNITY TO UNIFY THE LOWER 48 AND ALASKA IAMS PROGRAMS INTO ONE "BUREAU-WIDE" PROGRAM
- WAS DESIGNED WITH THE INTENT TO PROVIDE THE HARDWARE PLATFORM TO MEET BLM FIRE MANAGEMENT NEEDS FOR THE NEXT 5 - 7 YEARS
- WILL PROVIDE THE CAPABILITY OF SOFTWARE and DATA SHARING BETWEEN FIRE MANAGEMENT AND THE BUREAU'S MODERNIZATION EFFORT

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INITIAL ATTACK MANAGEMENT SYSTEM

BASE IAMS PROJECT GOALS:

- REPLACEMENT OF OUTDATED DATA GENERAL MODEL 20 COMPUTERS and PERIPHERALS (RIGS)
- UNIFICATION OF "LOWER 48" AND "ALASKAN" IAMS SYSTEMS
- STANDARDIZATION OF IAMS FUNCTIONS AND SOFTWARE, BUREAU- WIDE
- TO PROVIDE A HARDWARE PLATFORM WITH PERFORMANCE AND CAPACITY TO MEET CURRENT AND FUTURE GROWTH (IAMS II)
- TO PROVIDE A BASE SYSTEM TO UTILIZE and SHARE INDUSTRY STANDARD and BUREAU-WIDE SOFTWARE and CORPORATE DATA
- BETA TESTING OF SELECTED FUNCTIONS IN ALASKA FOR FIRE SEASON 1991
- FULL BUREAU-WIDE IMPLEMENTATION FOR FIRE SEASON 1992

INITIAL ATTACK MANAGEMENT SYSTEM

SPECIFIC BASE IAMS FUNCTIONS:

- ACQUISITION, DISPLAY AND ARCHIVE OF ALDS LIGHTNING STRIKE DATA
- ACQUISITION, DISPLAY AND ARCHIVE OF RAWS and OTHER WEATHER DATA
- DISPLAY OF PREDEFINED AND USER DEVELOPED GRAPHICS (MAPS)
- GRAPHICS DISPLAY OF FIRE FUELS AND TERRAIN DATABASES
- FIRE BEHAVIOR MODELING (BEHAVE)
- CENTRALIZED CONNECTION TO THE NEW U.S. FOREST SERVICE WEATHER INFORMATION MANAGEMENT SYSTEM (WIMS), (WIMS INCLUDES AFFIRMS)
- ELECTRONIC GENERATION AND TRANSMISSION OF RESOURCE ORDERS AND DISPATCH INFORMATION
- TEXT and GRAPHIC DISPLAY OF PROTECTION STATUS and LAND OWNERSHIP FOR ALASKA
- BUREAU-WIDE AND INTERAGENCY ELECTRONIC MAIL

InciNet
Incident Base Automation Project
Sponsored by
National Wildfire Coordinating Group

InciNet Design Conciderations

- Emulates the Current ICS command system
- Integrated Database Needed for Operations, Logistics, Plans, and Finance.
- Must Support Interagency Needs - Resource ordering, resource tracking, fire business management, and incident reporting, etc.
- Requires Telecommunication/Data exchange with Diverse Computer systems and Databases

InciNet

PRIMARY INCINET AUTOMATION OBJECTIVES

- Provide accurate, up-to-date resource and incident status information for both incident management decision making and up channel reporting.
- Provide real time capability to order and track resources.
- Provide a system that emulates the interagency Incident Command System and provides required ICS reports in a timely manner.
- Provide time accounting for personnel and equipment.
- Provide capability to electronically pass data to and receive data from multi-agency coordination and dispatch centers.
- Provide a standardized national InciNet automation system that meets requirements for Incidents managed in a multi-jurisdictional situation.

InciNet Development Philosophy

Use lots of :

- *Menus*
- *Choice Lists*
- *Help Screens*
- *Active Keys*

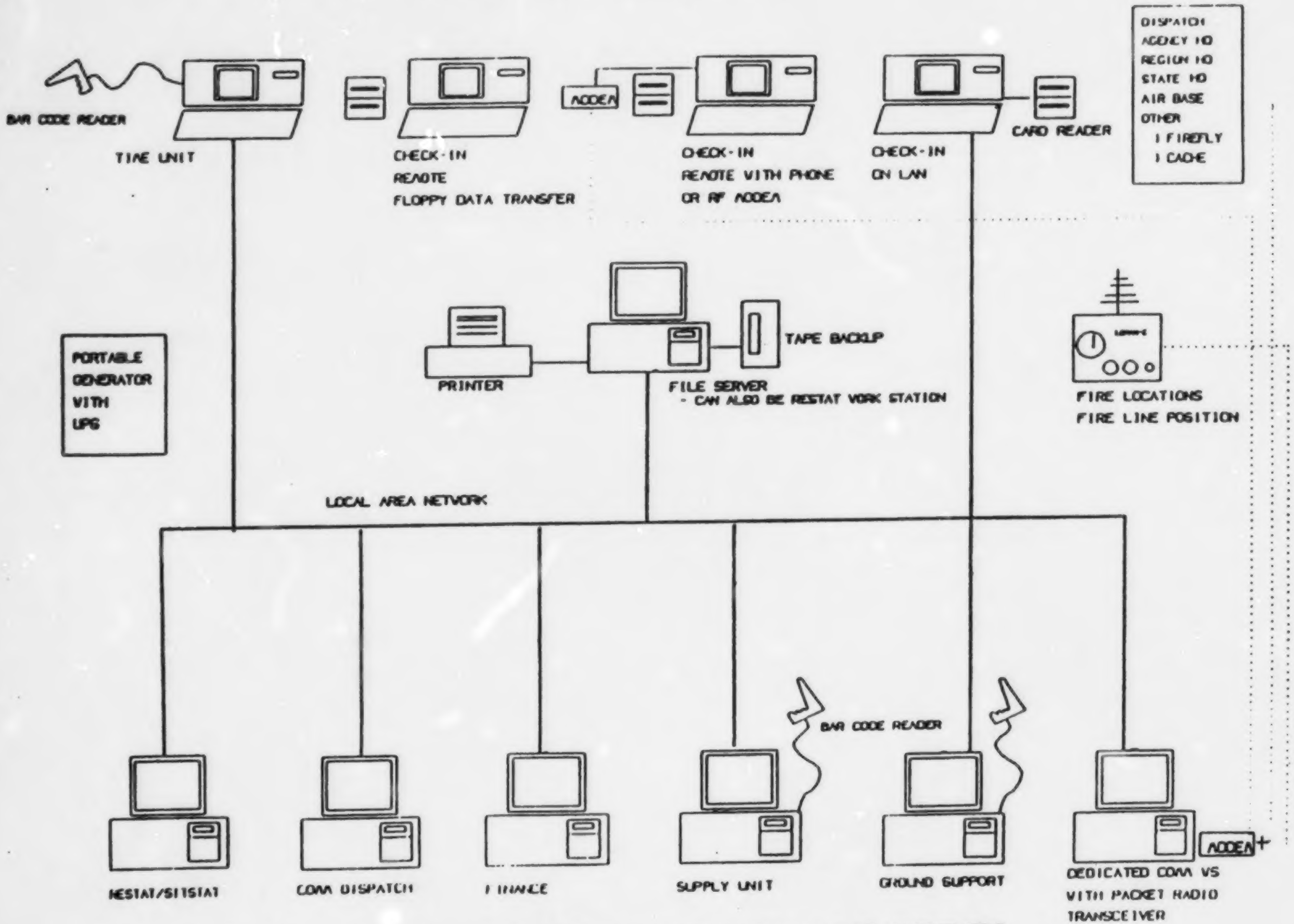
Minimize :

- *Command Line Input*

***** *KEEP IT SIMPLE* *****

IncINe

INCIDENT BASE HARDWARE LAYOUT


BAR CODE READER
TIME UNIT
CHECK-IN
REMOTE
FLOPPY DATA TRANSFER
MODEM
CHECK-IN
REMOTE WITH PHONE
OR RF MODEM
CHECK-IN
ON LAN
CARD READER
DISPATCH
AGENCY HQ
REGION HQ
STATE HQ
AIR BASE
OTHER
I FIREFLY
I CACHE
PORTABLE
GENERATOR
WITH
UPS
PRINTER
FILE SERVER
- CAN ALSO BE RESTAT WORK STATION
TAPE BACKUP
FIRE LOCATIONS
FIRE LINE POSITION
LOCAL AREA NETWORK
BAR CODE READER
RESTAT/SITSTAT
COMM DISPATCH
FINANCE
SUPPLY UNIT
GROUND SUPPORT
DEDICATED COMM WS
WITH PACKET RADIO
TRANSCEIVER
MODEM

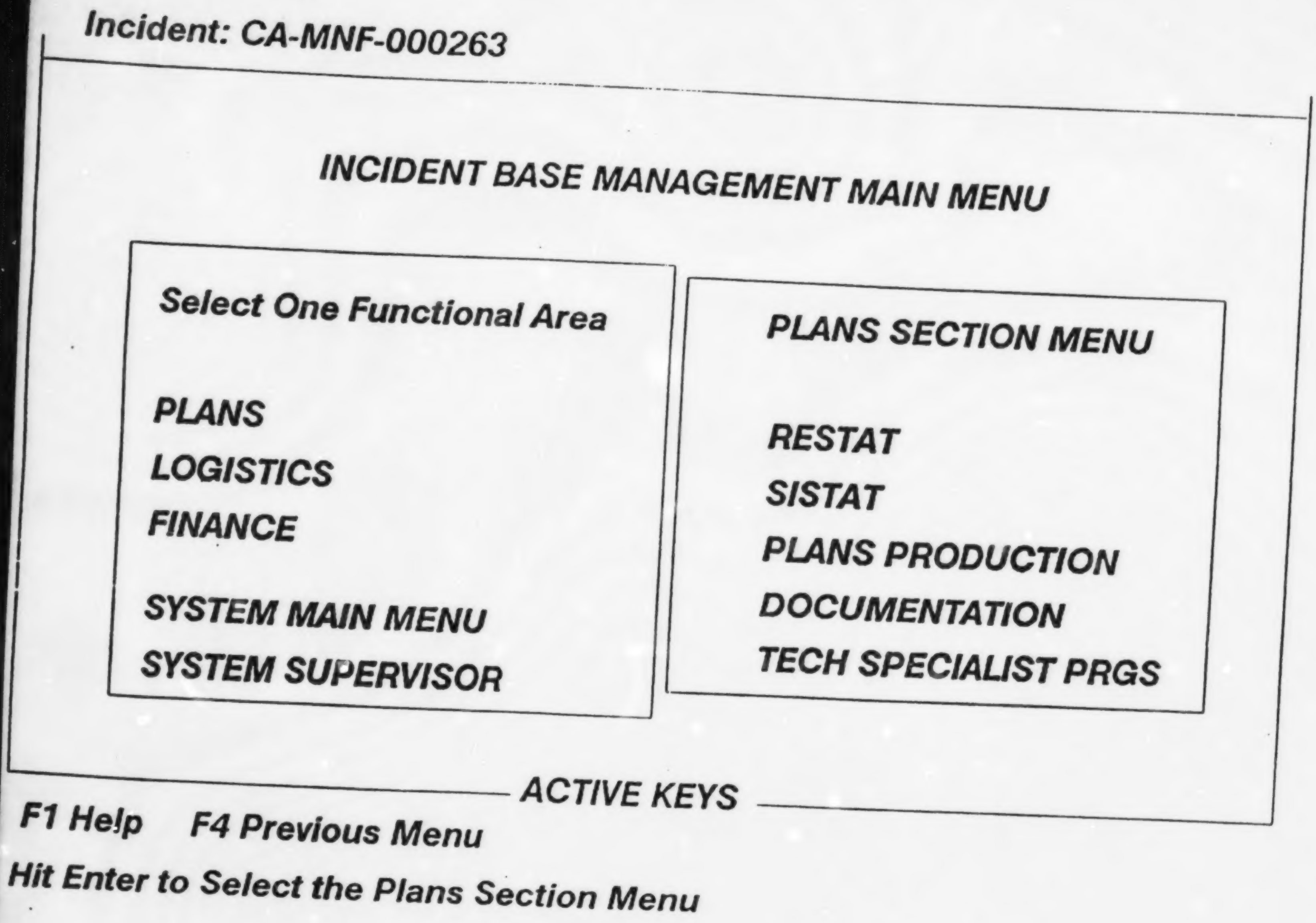
NOTE WORK STATIONS MAY CONSIST OF A MIX OF DUMB TERMINALS OR INTELLIGENT COMPUTER SUCH AS THE IBM PC OR APPLE.
ALL WORK STATIONS WILL NORMALLY BE EQUIPPED WITH A PRINTER

May 31 1990

InciNet Menu Hierarchy

- * INCINET MAIN MENU
  - PLANS
    - RESTAT
      - CHECK-IN
        - MANUAL
        - SMART CARD
        - FLOPPY
      - RESOURCE MANAGEMENT
        - ORDERING
        - ASSIGNMENT AND STATUS
        - EQUIP & PERSONNEL UPDATE
      - DEMOBILIZATION
    - SITSTAT
      - ICS 209 INCIDENT SUMMARY REPORT
  - FINANCE

InciNet



Incident: CA-MNF-000263

INCIDENT BASE MANAGEMENT MAIN MENU

Select One Functional Area

PLANS
LOGISTICS
FINANCE

SYSTEM MAIN MENU
SYSTEM SUPERVISOR

PLANS SECTION MENU

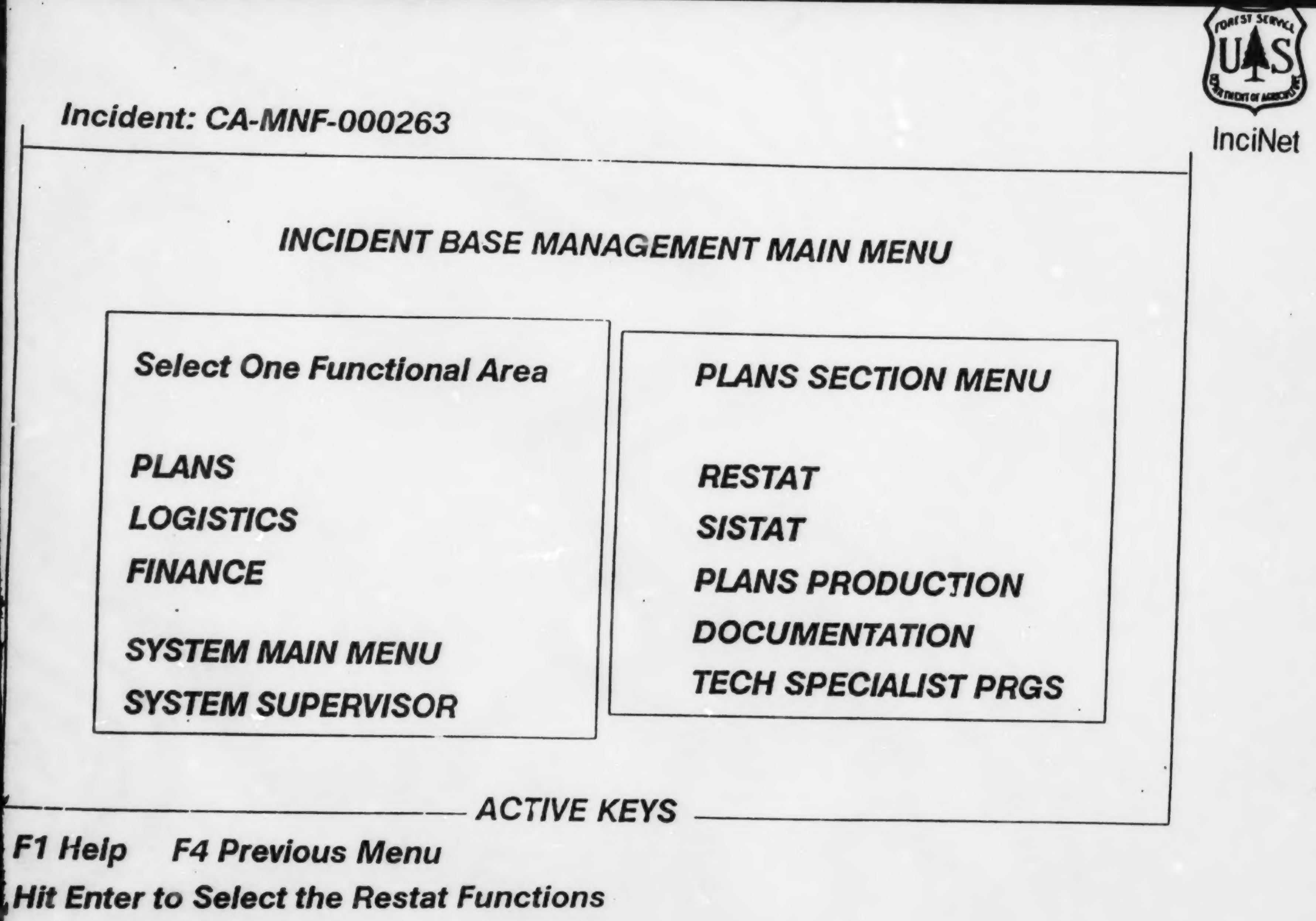
RESTAT
SISTAT
PLANS PRODUCTION
DOCUMENTATION
TECH SPECIALIST PRGS

ACTIVE KEYS

F1 Help   F4 Previous Menu

Hit Enter to Select the Plans Section Menu

Screen 1



InciNet

Incident: CA-MNF-000263

INCIDENT BASE MANAGEMENT MAIN MENU

Select One Functional Area

PLANS
LOGISTICS
FINANCE

SYSTEM MAIN MENU
SYSTEM SUPERVISOR

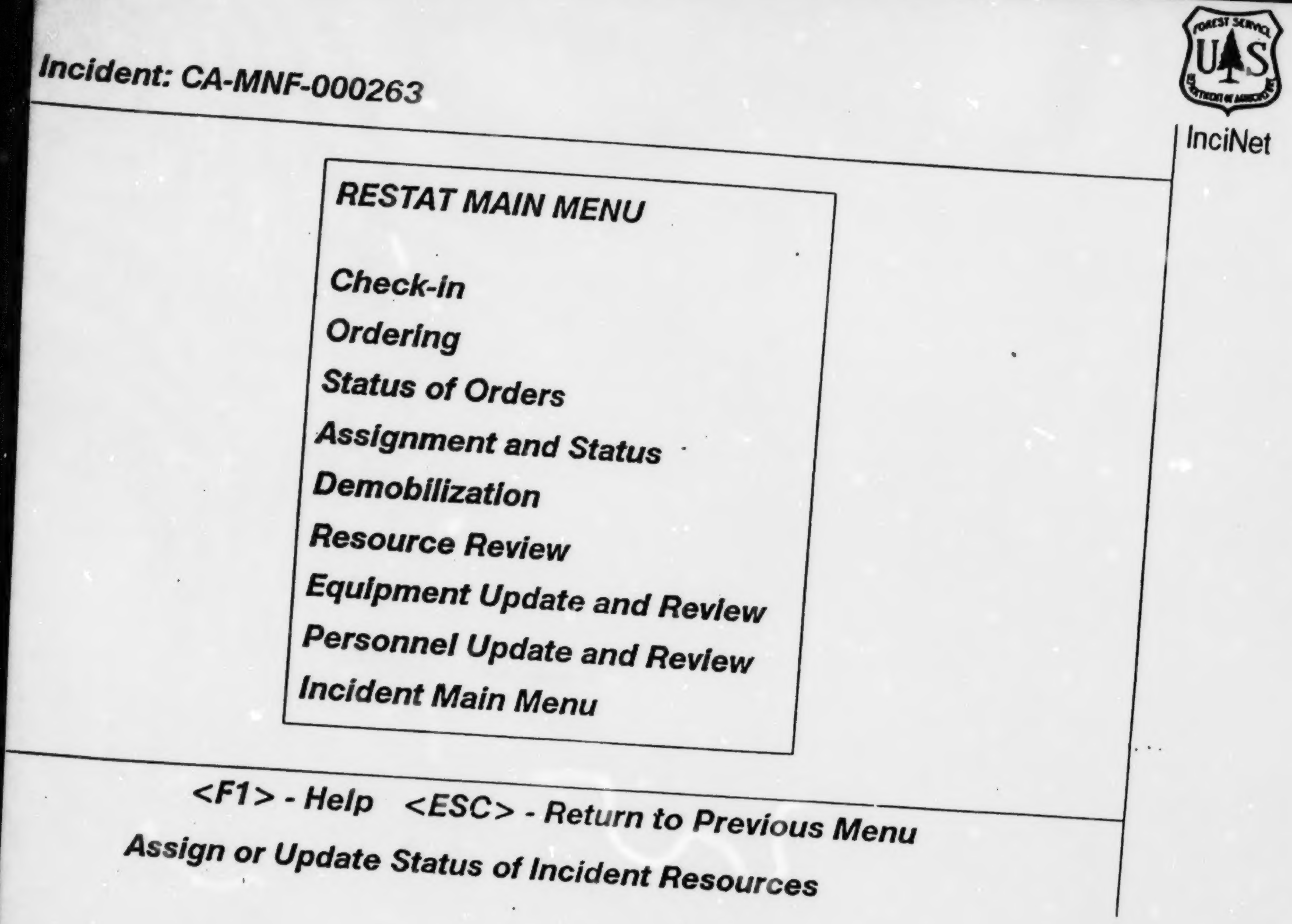
PLANS SECTION MENU

RESTAT
SISTAT
PLANS PRODUCTION
DOCUMENTATION
TECH SPECIALIST PRGS

ACTIVE KEYS

F1 Help **F4 Previous Menu**
Hit Enter to Select the Restat Functions

Screen 2



Incident: CA-MNF-000263

InciNet

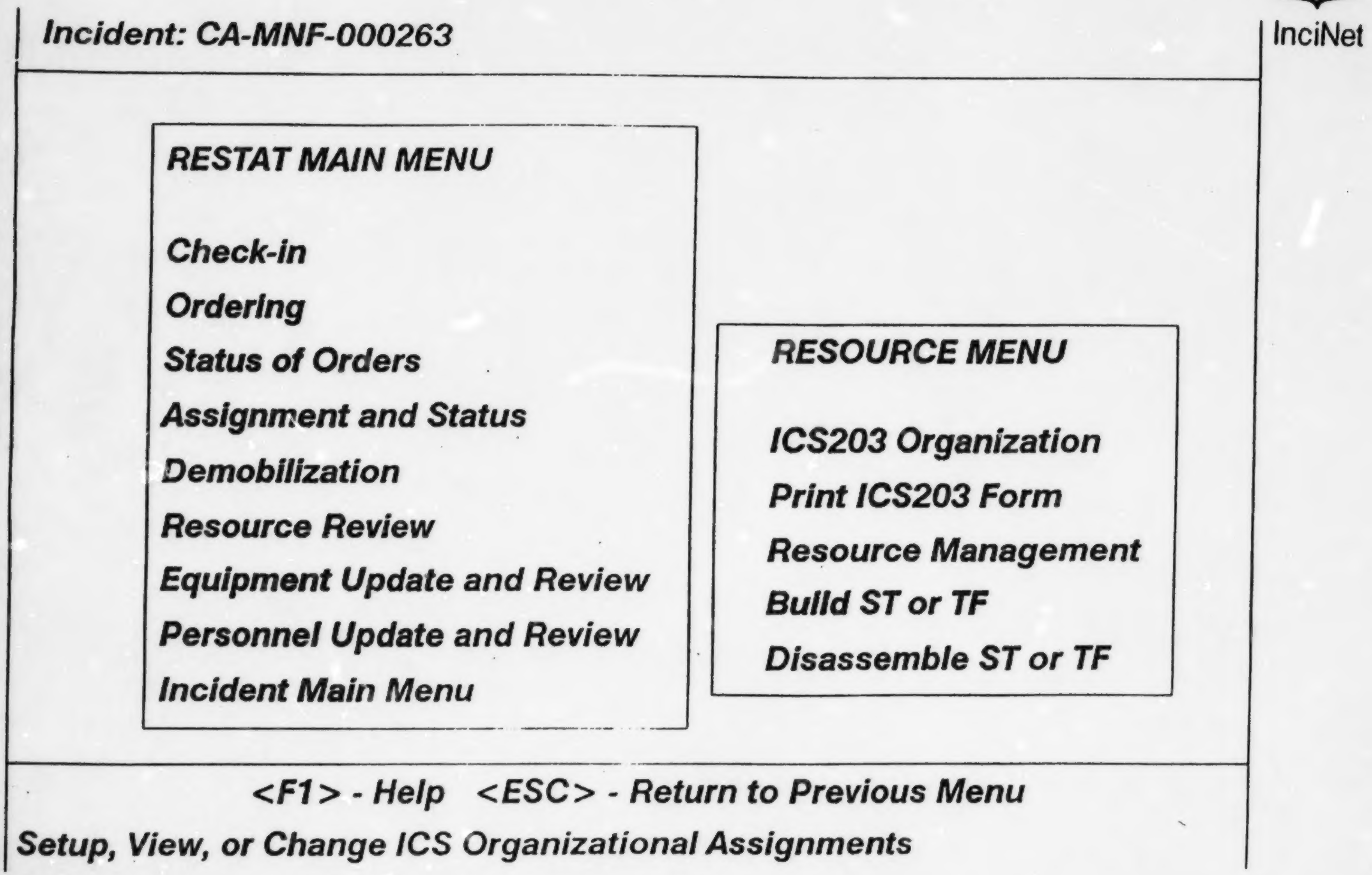
RESTAT MAIN MENU

- Check-in
- Ordering
- Status of Orders
- Assignment and Status
- Demobilization
- Resource Review
- Equipment Update and Review
- Personnel Update and Review
- Incident Main Menu

<F1> - Help   <ESC> - Return to Previous Menu

Assign or Update Status of Incident Resources

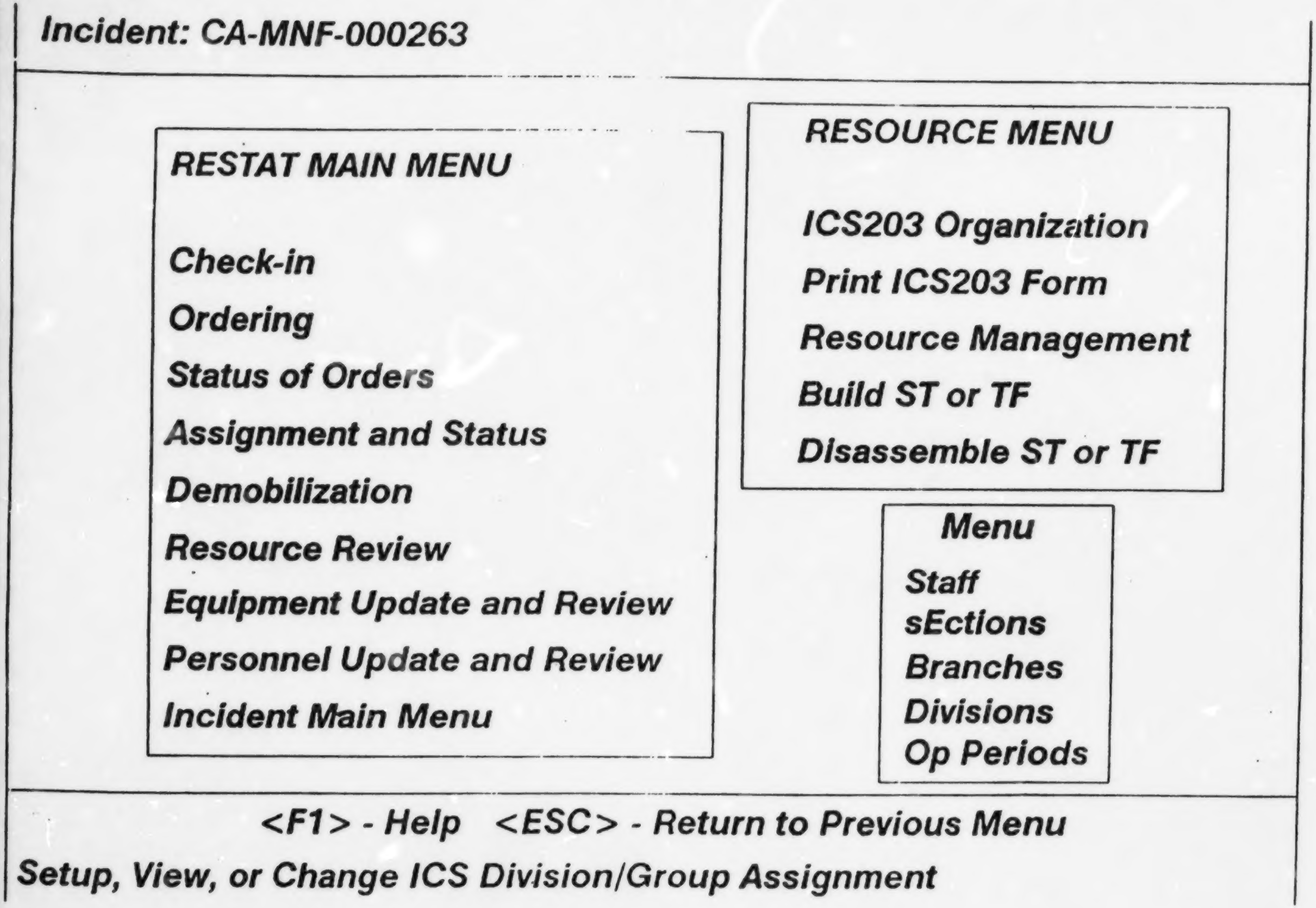
Screen 3


InciNet
RESTAT MAIN MENU
Check-in
Ordering
Status of Orders
Assignment and Status
Demobilization
Resource Review
Equipment Update and Review
Personnel Update and Review
Incident Main Menu
RESOURCE MENU
ICS203 Organization
Print ICS203 Form
Resource Management
Build ST or TF
Disassemble ST or TF
<F1> - Help
<ESC> - Return to Previous Menu

Incident: CA-MNF-000263

Setup, View, or Change ICS Organizational Assignments

Screen 4

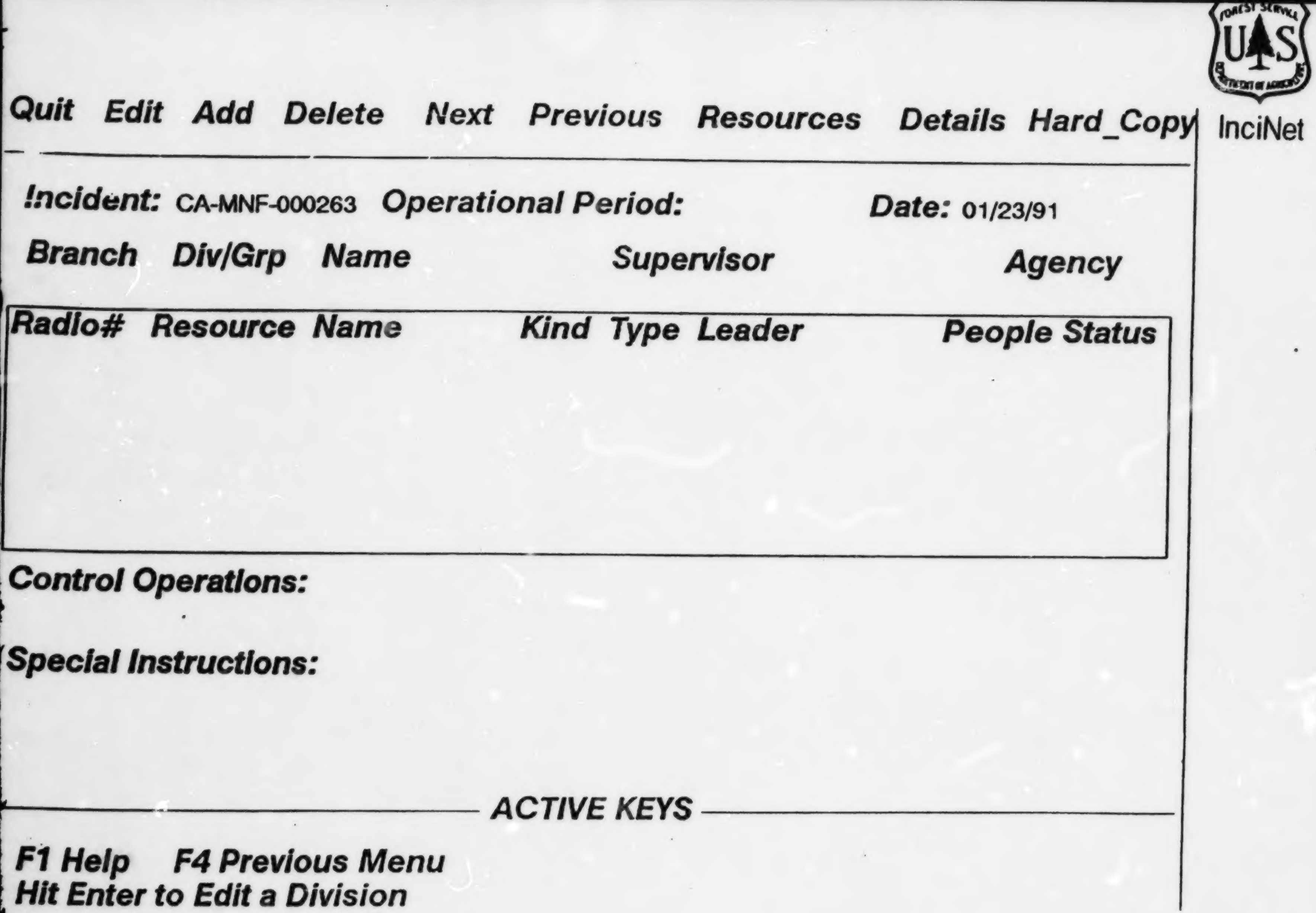

InciNet
RESTAT MAIN MENU
Check-in
Ordering
Status of Orders
Assignment and Status
Demobilization
Resource Review
Equipment Update and Review
Personnel Update and Review
Incident Main Menu
RESOURCE MENU
ICS203 Organization
Print ICS203 Form
Resource Management
Build ST or TF
Disassemble ST or TF
Menu
Staff
sEctions
Branches
Divisions
Op Periods

Incident: CA-MNF-000263

<F1> - Help <ESC> - Return to Previous Menu

Setup, View, or Change ICS Division/Group Assignment

Screen 5


Quit Edit Add Delete Next Previous Resources Details Hard_Copy
InciNet

Incident: CA-MNF-000263 **Operational Period:** **Date:** 01/23/91

Branch	Div/Grp	Name	Supervisor	Agency

Radio#	Resource Name	Kind	Type	Leader	People	Status

Control Operations:

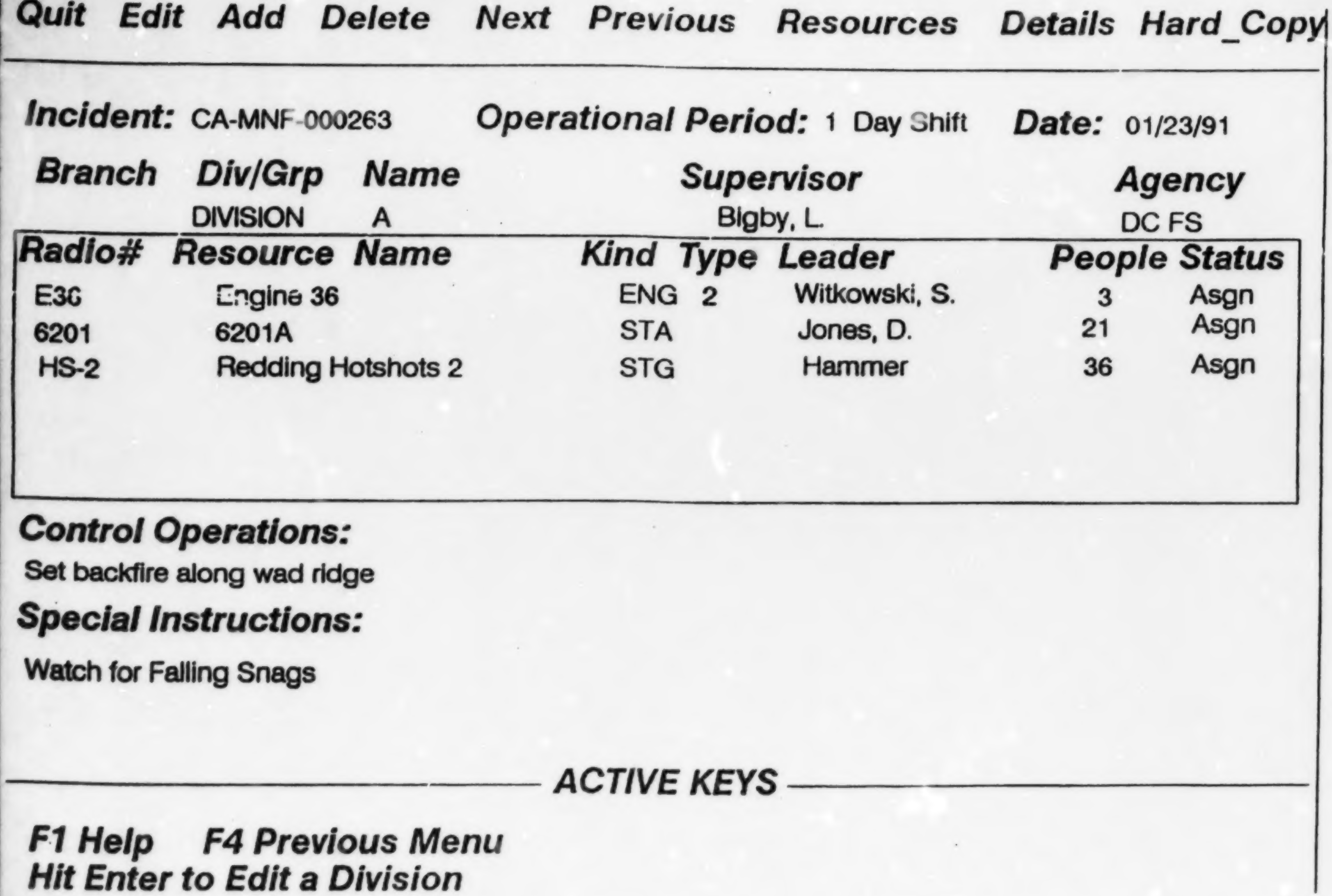
Special Instructions:

ACTIVE KEYS

F1 Help F4 Previous Menu
Hit Enter to Edit a Division

Screen 6

InciNet


Quit Edit Add Delete Next Previous Resources Details Hard_Copy

Incident: CA-MNF-000263 **Operational Period:** 1 Day Shift **Date:** 01/23/91

Branch	Div/Grp	Name	Supervisor	Agency
	DIVISION	A	Bigby, L.	DC FS

Radio#	Resource Name	Kind	Type	Leader	People	Status
E36	Engine 36	ENG	2	Witkowski, S.	3	Asgn
6201	6201A	STA		Jones, D.	21	Asgn
HS-2	Redding Hotshots 2	STG		Hammer	36	Asgn

Control Operations:

Set backfire along wad ridge

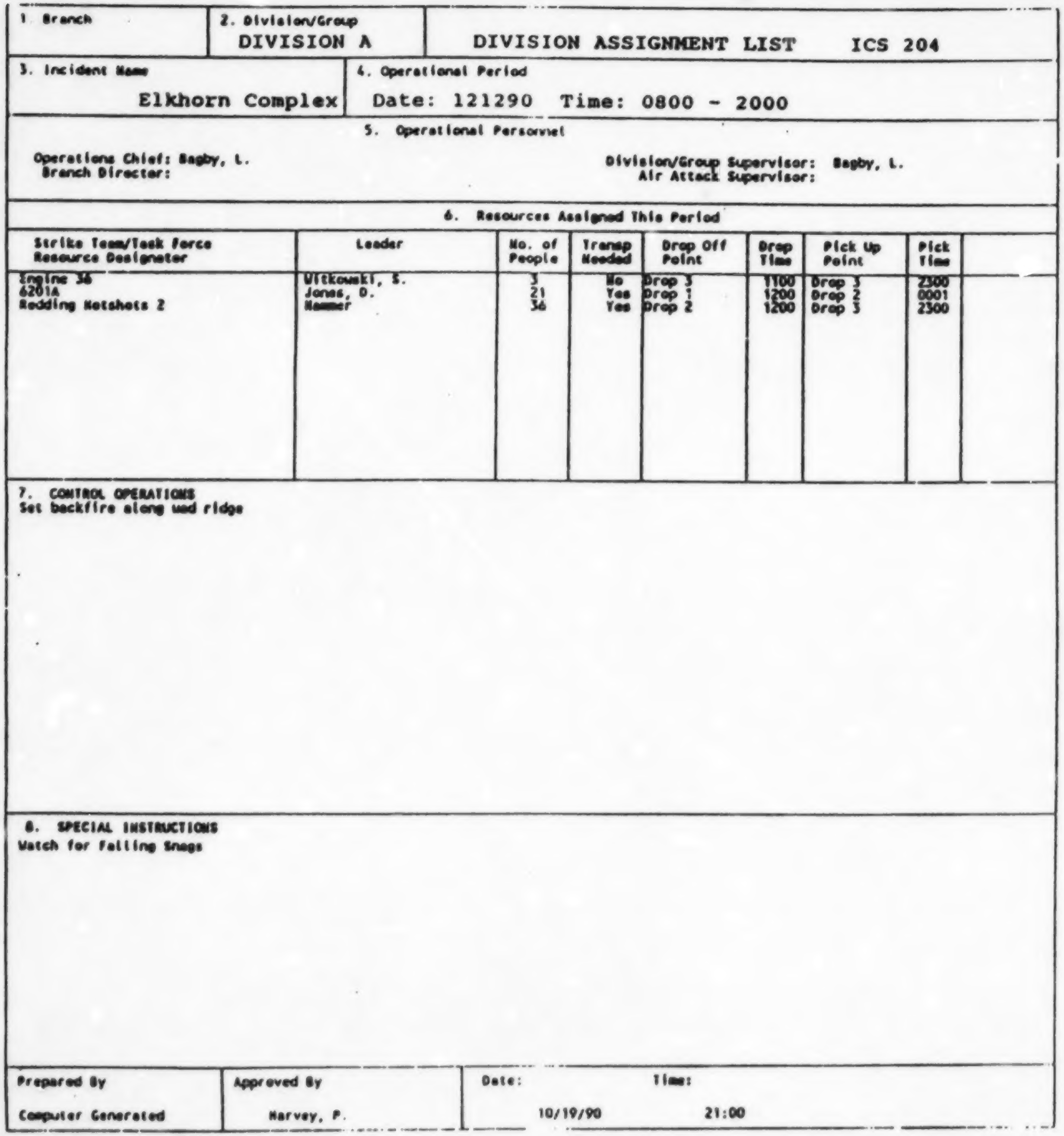
Special Instructions:

Watch for Falling Snags

ACTIVE KEYS
F1 Help F4 Previous Menu
Hit Enter to Edit a Division

Screen 7

InciNet



1. Branch	2. Division/Group DIVISION A	DIVISION ASSIGNMENT LIST ICS 204
3. Incident Name Elkhorn Complex	4. Operational Period Date: 121290 Time: 0800 - 2000	

5. Operational Personnel

Operations Chief: Bagby, L.
Branch Director:
Division/Group Supervisor: Bagby, L.
Air Attack Supervisor:

6. Resources Assigned This Period

Strike Team/Task Force Resource Designator	Leader	No. of People	Transp Needed	Drop Off Point	Drop Time	Pick Up Point	Pick Time	
Engine 36	Witkowski, S.	3	No	Drop 3	1100	Drop 3	2300	
6201A	Jones, D.	21	Yes	Drop 1	1200	Drop 2	0001	
Redding Hotshots 2	Hammer	36	Yes	Drop 2	1200	Drop 3	2300	

7. CONTROL OPERATIONS
Set backfire along wad ridge

8. SPECIAL INSTRUCTIONS
Watch for Falling Snags

Prepared By Computer Generated	Approved By Harvey, P.	Date: 10/19/90	Time: 21:00

Print Out 1

Incinet Development Status Summary

Resource Assignment/Status Module is approximately 80% complete

Manual Check-In Status being integrated with Smart Card Check-In

Printing program for ICS-209 is being modified for printing in UNIX

X.400 PC UNIX compatible gateways are being investigated

Firefly .DXF to Generic CADD 5.0 translation being tested

Resource Ordering screens are near completion

New Database Design completed { 01/91 }

Demob nomination modules done, demob summary screen done

Work continues on Demob detail screen and Zoom screens

Initial Incident Status Program (ICS 201 Info) - work in progress

Debugging, testing and enhancement is ongoing

InciNei

InciNet - Firefly Integration

1. Receive Fire Data File by Radio
2. JPL software translates data file
3. U.S.F.S. software translates data file to CADD format
4. CADD file is plotted
5. CADD file is translated and integrated into InciNet data base
    a. Maintain Firefly data
    b. Analyze Firefly data

Forest Service
U S
Department of Agriculture

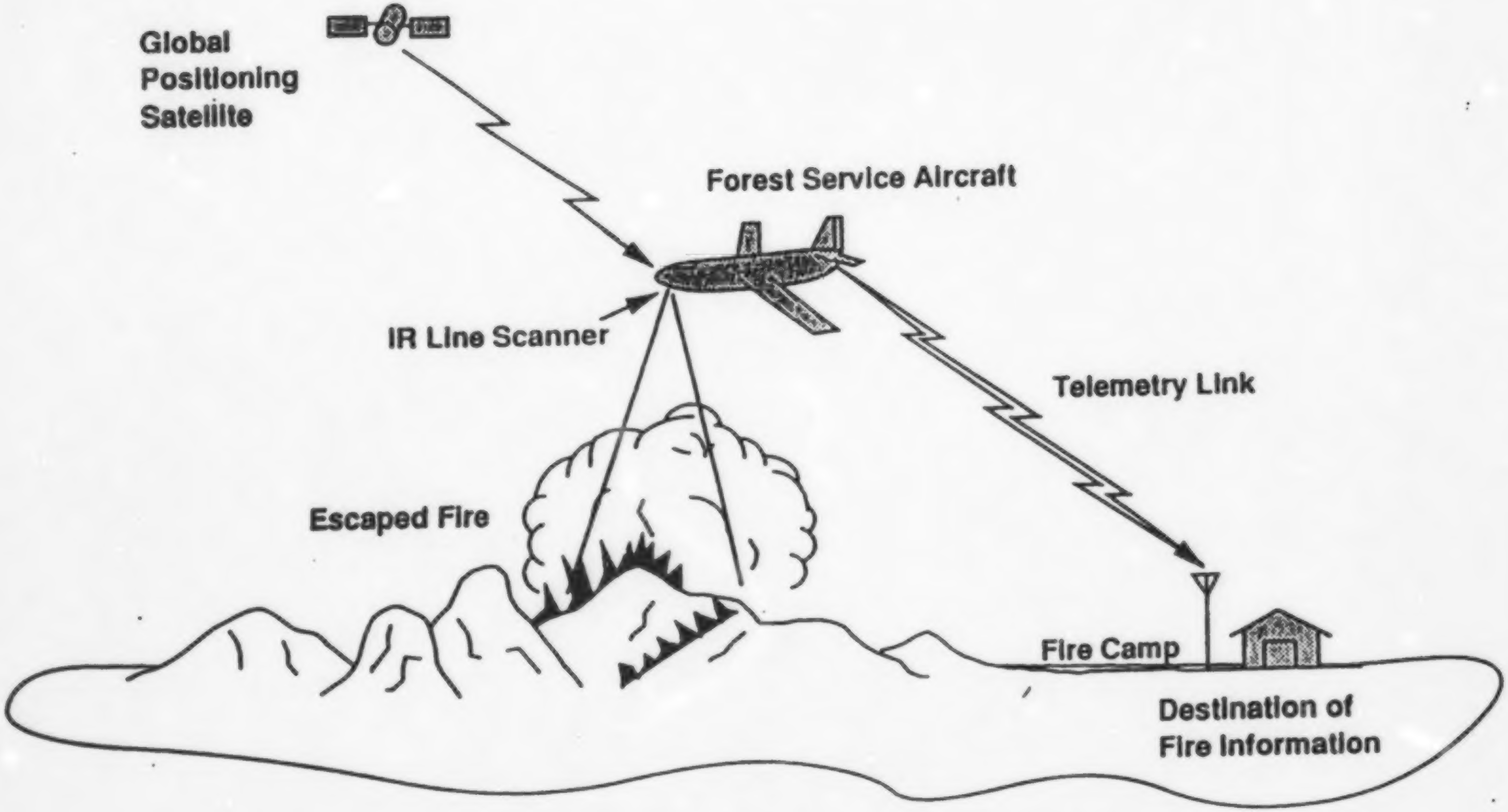
NASA
National Aeronautics and
Space Administration
Jet Propulsion Laboratory

FIREFLY

TO DEVELOP AND IMPLEMENT A STATE-OF-THE-ART WILDLAND FIRE MAPPING AND HOT SPOT OR SMALL FIRE DETECTION INFORMATION SYSTEM TO GATHER, TRANSMIT, AND DISPLAY NEAR REAL-TIME WILD LAND FIRE DATA.

FIREFLY

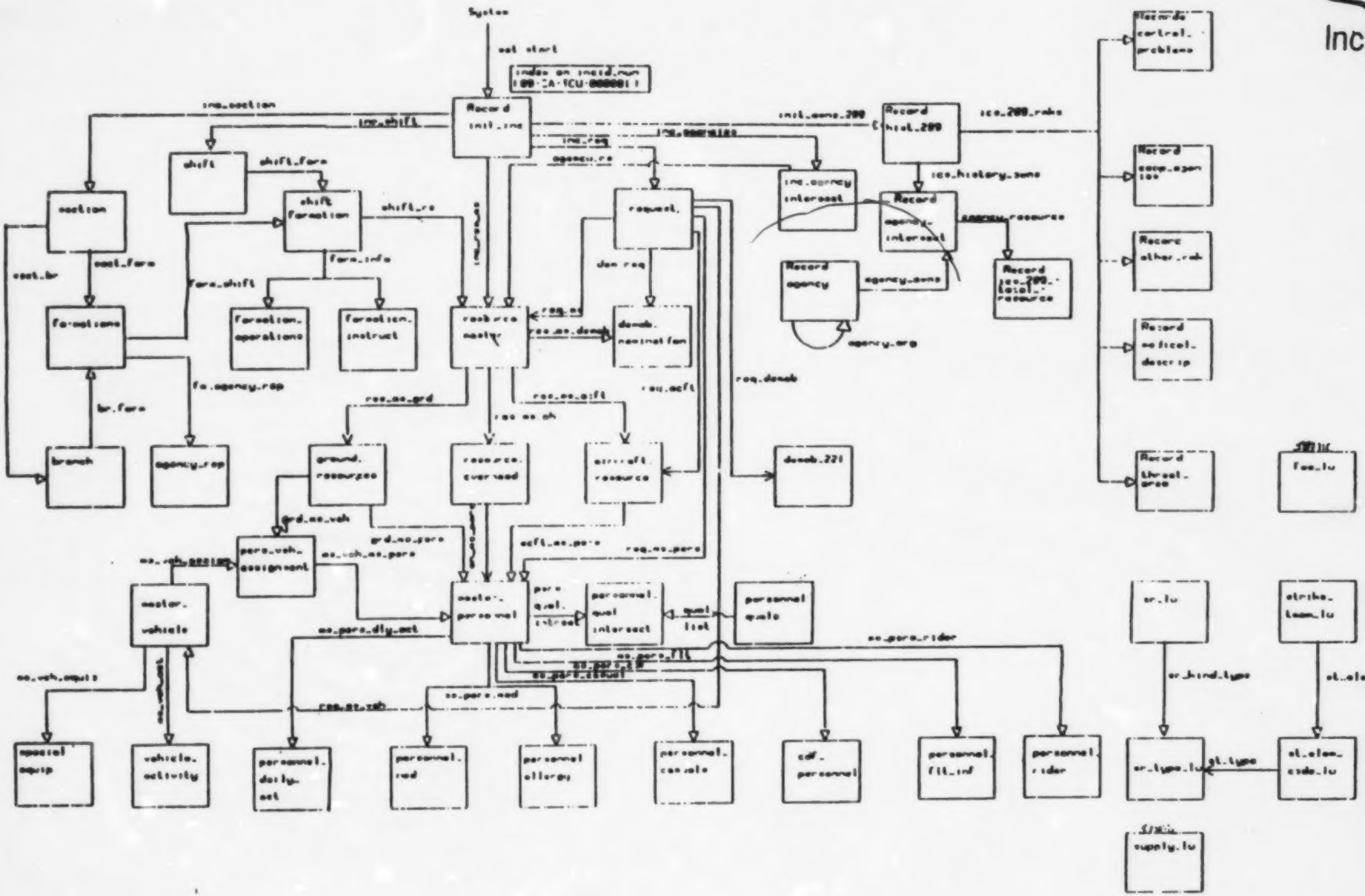
SYSTEM CONCEPT


Global
Positioning
Satellite
Forest Service Aircraft
IR Line Scanner
Telemetry Link
Escaped Fire
Fire Camp
Destination of
Fire Information

- AIRBORNE REMOTE SENSING SYSTEM DETERMINES FIRE PERIMETER AND HOT SPOT LOCATIONS
- GEOREFERENCED PLOTS ARE TRANSMITTED TO THE FIRE COORDINATION CAMP IN NEAR REAL TIME

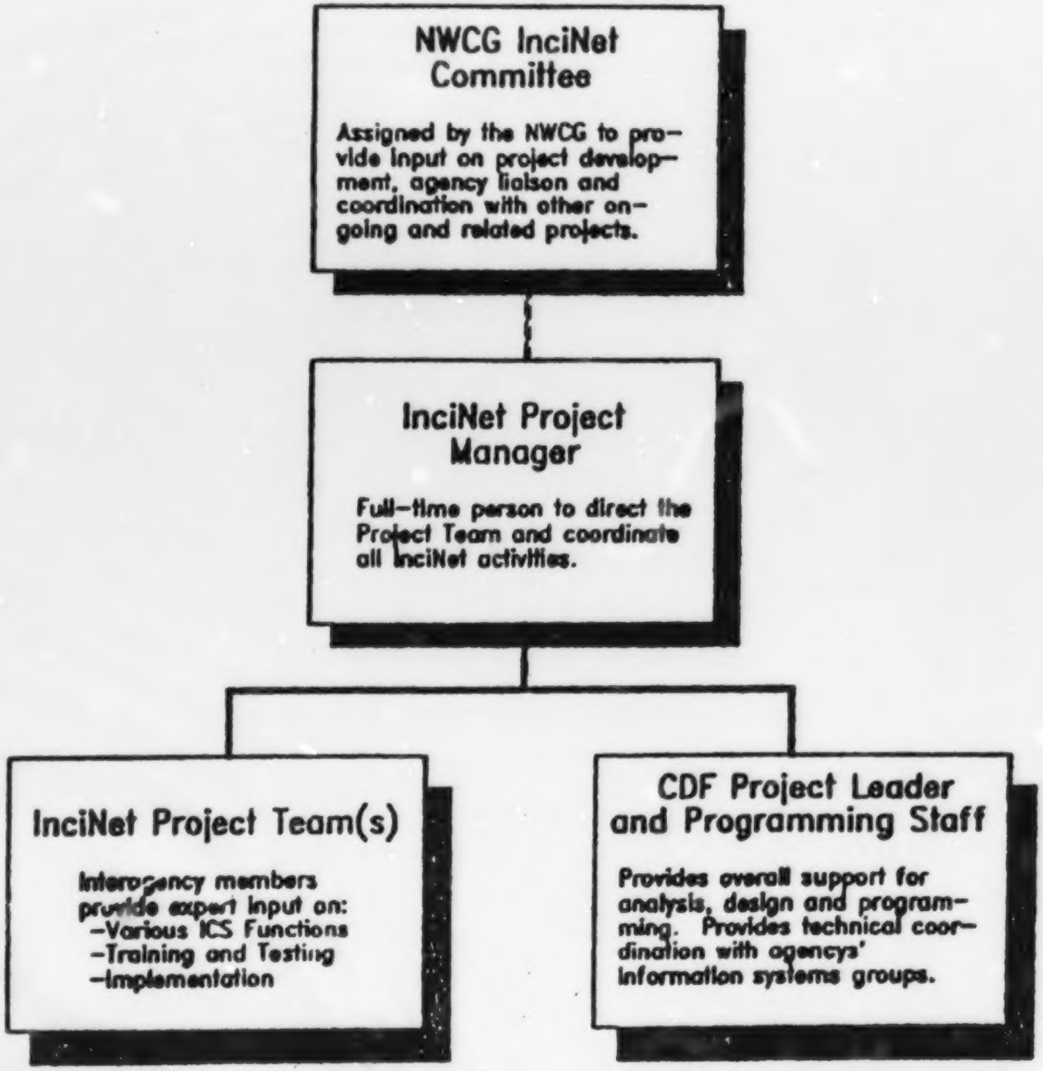
InciNet

InciNet Phase I Database Schema - December 17, 1990


System
set start
index on incid_num
Record init_inc
inc_section
inc_shift
inc_req
agency_rc
init_ssns_209
Record hist_209
ics_209_rsks
ics_history_sums
inc_agency interest
Record agency_interest
agency_resource
Record agency
agency_sums
agency_org
Record ics_209_total_resource
Records control_problems
Record coop_agencies
Record other_rsk
Record political_descrip
Record threat_area
fse_lu
shift
shift_form
section
sect_form
sect_br
shift formation
shift_rs
form_info
form_shift
formations
formation_operations
formation_instruct
fo_agency_rep
br_form
branch
agency_rep
request
dem req
req_rs
resource_master
rsc_ms_demob
demob_nomination
req_acft
req_demob
rsc_ms_grd
rsc_ms_oh
rsc_ms_aft
ground_resources
resource_overhead
aircraft_resource
demob_221
grd_ms_veh
grd_ms_pers
acft_ms_pers
req_ms_pers
pers_veh_assignment
ms_veh_ms_pers
ms_veh_assign
master_vehicle
master_personnel
pers_qual_intrsct
personnel_qual intersect
qual list
personnel quals
ms_pers_dly_act
ms_pers_rider
ms_pers_flt
ms_pers_med
req_ms_veh
ms_veh_equip
special equip
vehicle_activity
personnel_daily_act
personnel_med
personnel allergy
personnel_console
cdf_personnel
personnel_flt_inf
personnel_rider
sr_lu
strike_team_lu
sr_kind_type
st_element_kind
sr_type_lu
st_type
st_elem_code_lu
supply_lu

InciNet

INCINET ORGANIZATION CHART



NWCG InciNet Committee

Assigned by the NWCG to provide input on project development, agency liaison and coordination with other ongoing and related projects.

InciNet Project Manager

Full-time person to direct the Project Team and coordinate all InciNet activities.

InciNet Project Team(s)

Interagency members provide expert input on:
- Various ICS Functions
- Training and Testing
- Implementation

CDF Project Leader and Programming Staff

Provides overall support for analysis, design and programming. Provides technical coordination with agencys' information systems groups.

revised 3-90

INCIDENT COMMAND SYSTEM

. A system whereby different agencies work together toward a common goal of effectively and efficiently managing an incident.

. The incident can range from a small emergency to major catastrophies.

. ICS provides for :

Common Terminology
Modular organization
Integrated communications
Unified command structure
Consolidated action plans
Manageable span-of-control
Predesigned incident facilities
Comprehensive resource management

InciNet

InciNet DEVELOPMENT PERSONNEL

Project Leader
- manage day to day activities
- produce initial module and screen designs
- Data Base Administrator
- insure that project specifications are met

Programmer/Analyst
- module development
- UNIX LAN
- program module integration

Programmer/Analyst
- module development
- telecommunications
- program module integration

Programmer/Analyst
- module development
- external data exchange

UNIX System Administrator
- maintain UNIX system
- test UNIX LAN and peripherals
- write and maintain logs

***InciNet Liaison**
- coordinate federal requirements with InciNet
- Firefly NASA/JPL - InciNet coordination
- module development

*U.S.F.S.

USDA FOREST SERVICE

UNITED STATES CALENDAR YEAR REPORT

1991 CALENDAR YEAR REPORT

"The Year of Initial Attack"

UNITED STATES FOREST SERVICE

In the month of February the Fire Management Community nationwide was analyzing and making preparation for the 1991 fire season. There was hard evidence that extreme drought conditions remained in California, Eastern Oregon, Central Washington, Southwest Colorado, Southern North Dakota, and Northwest Minnesota. Snowpack came late and was near normal to above normal in many portions of the West after several March storms. Alaska had a near record snowpack. However, fuel moisture measurements in 1,000 hr. fuels indicated that fuels in many areas of the west did not recover from the previous years' drought. Live fuels showed a stress point normally found in July. Coupled with the environmental conditions was the fact that contingency support that normally came from the military for the past five years could not be planned on as a result of operation "Desert Storm".

The following official recommendations were published and became the basis for the build-up of suppression forces in anticipation of another predicted severe fire season:

(1) The only way to cope with wildfires in drought years is with rapid and effective initial attack. Never let a fire get large.

(2) Implement and strengthen cooperative and coordinating efforts at all levels. The need to marshal all of the resources in an area will contribute to success.

(3) Accelerate the programs that contribute to preventing and detecting fires. Consider early activation of dispatch centers. Provide necessary aircraft and equipment inspections early in the season.

(4) Increase vigilance and management attention by all levels of management to potentially emerging situations. With fewerresources and longer time frames for delivery, manage what you have well. Consider alternatives and substitutions that may do the work as well.

As a result of these adopted strategies, field organizations prepared accordingly. Extra crews were trained and placed in strategic locations. Early smokejumper training took place as well as additional numbers hired. Overhead training was accelerated and large numbers of the fire community became available at an earlier time frame. Aircraft and equipment was inspected ahead of schedule and locations of greatest need identified. Active prevention and public awareness programs were increased. Severity funding by each agency was coordinated and stressed at all levels. Everyone was ready for a tough fire season with augmented forces and strategies in place.

January-March

Abundant precipitation occurred throughout this period in the eastern section of the country, especially portions of the south. The Southern Area's spring fire season was the least severe season in the past 10 years. Acres burned were about 20% of the five year average.

By March first, the snowpack in the West was very alarming. In the Sierra-Neveda's the snowpack was 15% of normal, in Oregon 36% of normal, and in Idaho 62% of normal. By mid-March the weather pattern changed. Storm systems began moving into the West on a regular basis and provided much needed rain and snow.

April

In early April, the first major fire activity of 1991 that required commitment of Type I and Type II teams occurred on the Black Hills N.F. of South Dakota and the Custer N.F. of Montana. Air tankers were activated early. This early activity was short lived as the normal spring showers arrived throughout the West. Periodic storminess occurred throughout the month of April in the Western United States. By late April "green up" was occurring in the South, bringing their spring season to a close.

May

On May 23, a "Limited" fire on the Kenai Peninsula of Alaska burned more than 8,000 acres before being controlled. A Type I team was committed. The month of May also produced the normal start of fire season in the Southwest. May continued the trend established in April with storm systems moving through the Pacific Northwest, Northern Rockies, and Great Basin. These storm systems alleviated drought conditions in many areas along with delaying the onset of fire season in the west. May did not go without disaster however as a Northern Rockies Smokejumper was killed making a training jump when he failed to successfully deploy his main or reserve parachute. A U.S. Forest Service lead plane on an administrative flight crashed near Prineville, Oregon. There were no injuries associated with this crash.

June

The Western fire season was delayed by an unusually wet spring. Successful initial attack activity continued throughout the Southwest as they were experiencing moderate fire activity from lightning storms that were accompanied by some moisture. Alaska began to warm up as a series of lightning storms triggered extensive initial attack smokejumper activity and some Type II team commitment. By the end of the month, 225 smokejumpers were stationed throughout the state along with considerable overhead, crew, aircraft, and equipment support. On June 21, a U.S. Forest Service Lead Plane working on the Ziplock fire crashed on the

Cibola N.F. killing the pilot. On June 24, some 2,000 lightning strikes ignited 70 fires from Galena, Alaska, to the Canadian border. A fire on the Gila National Forest reached 300 acres. On the 26th, 43 new fires were reported in Alaska. Fire B176 in the Tanana Zone, a State of Alaska Fire, was at 15,972 acres, and the Lava Fire near Albuquerque required a Class II Team. On the 28th of June, 25 new starts occurred, and Alaska reported nine fires burning for 14,775 acres under a modified suppression strategy, and 28 fires burning for 42,391 acres burning under a limited strategy. The fact that so few fires reached significant size is attributed to the effectiveness of initial attack forces coupled with moisture associated with lightning activity. During this same period of time there was considerable action in Canada with areas of difficulty centered in the Yukon Territory and in Quebec where two large fires, the Bersimis, 475,000 acres and Forrestville, 216,688 acres raged.

July

The successful initial attack trend continued during the month of July. Lightning activity was greater than that experienced during the 1990 season, however, moisture associated with most lightning storms complemented initial attack forces throughout the West. By July 5, a 600 acre fire in Washington, the Rock Creek Fire required a Type II team. By July 9, Alaska began releasing resources. The Pelican Fire in Yellowstone gained a lot of notoriety for a 220 acre fire. The Kwis-Kwis Fire on the Challis N.F. at 150 acres, was being suppressed using a confine/contain strategy. Fires were becoming more widely scattered throughout the West, with daily averages reaching 170 fires. Initial attack was still highly successful. By mid July there were 75 fires for 435,056 acres burning in Alaska under something less that full suppression strategy. Scattered storms ignited fires in Idaho, Oregon, and California. National Forests in Northern California were taking suppression action on over 400 fires . On July 18, the Thompson Creek Fire on the Gallatin N.F. required a Type I Team and grew to over 7,700 acres before control. 53 crews, 23 of which were Type I, 16 helicopters, 30 engines, and 386 overhead plus other miscellaneous support took part in this massive suppression effort. There were also fires in western Utah and eastern Nevada in the 2,000 acre range. On July 24, of the 403 fire starts, only one exceeded 100 acres. At July's conclusion Alaska had 52 fires still burning for 915,567 acres under "limited suppression".

Southern California experienced unseasonably cool weather and above average precipitation. A monsoonal flow of moist, tropical air moved into the Rockies and ignited daily thunderstorms after mid-month. In the Pacific Northwest, pockets of above normal rainfall were due to a pair of frontal passages around the middle of July. Fire season in the Southwest came to a close in early July with the normal onset of monsoonal moisture.

August

The normally hectic August fire season didn't happen! Though conditions were severe in wide areas of the West and lightning was extensive in the

Northwest, Great Basin, and Northern Rockies, and initial attack forces were very busy, support was needed on very few fires. Type I Team commitment was required on the Kitchen Fire, Salmon N.F., 1,790 acres; Stockton, San Bernadino N.F., 1,430 acres; and the McKim Fire, Salmon District BLM and Salmon N.F., 4,940 acres. Type II teams saw some action in Washington, Oregon, Idaho, Montana, and Nevada. The most difficult fires to control were in the central mountains of Idaho and the Northern Rockies. Severity funded resources were used extensively to control these fires.

September

Widespread lightning continued throughout the Great Basin, Northern Rockies and portions of the Northwest during the first week of September. Two incidents required Type II Team commitment during this period. The Twin Lakes Fire on the Wallowa-Whitman N.F., 130 acres and the Squaw Lake Fire on the Payette N.F., 280 acres. The Rush Creek Fire, located within the Frank Church River of No Return Wilderness, was being suppressed using a confinement strategy, and grew to 3,000 acres before being controlled. The Net and Lucille Lake fires in the Voyageurs National Park in Minnesota each burned more than 400 acres before being contained on September 8. An upper level low pressure system moved into the Northwest producing showers and cooler temperatures during the weekend of September 7-8. By September 11, a more normal fall weather pattern was in place over the west with no significant fire activity occurring.

In late September a normal summer weather pattern developed in the West, the type of weather pattern that would have caused severe fire problems had it occurred in July or August. There were another series of dry lightning storms in Northern California, Oregon, Northern Rockies, and Great Basin. In addition strong east winds occurred periodically in the Northwest and Northern California. Several Type II fires occurred in Oregon, Idaho, Montana, and Northern California during this period.

October

Fire conditions in the Northwest, Northern Rockies, Northern California, and the Great Basin continued to worsen in October. A strong ridge of high pressure along or just off the West coast combined with periodic wind events created the most severe fire conditions of the 1991 season.

Several Type II fires occurred throughout the west in early October. On October 11, strong east winds kindled the Falls Creek fire, Mt. Hood National Forest, and the Warner fire, Willamette National Forest, and Type I fire teams were committed to these fires. The Warner fire burned 9,200 acres before being controlled by a work force of 2,700 people. Another Type I fire team was mobilized for the Game Range fire in the Northern Rockies.

Red flag warnings on October 16th alerted the fire community to strong winds with the passage of a dry cold front through the Northern tier of states. Devastating winds swept through Eastern Washington, Northern

Idaho, Montana, and Wyoming causing several major fires. The area in and around Spokane, Washington was the most affected. Over 50 fires, many started from downed powerlines, burned 40,000 acres and destroyed 50-100 homes. In the Northern Rockies, three Type I fire teams were committed to fires in Northern Idaho and Montana. In the Great Basin, one Type I fire team was mobilized for the Dry Cottonwood fire on the Bridger-Teton National Forest. The National Interagency Fire Coordination Center went to Fire Preparedness Level III for the first time this year. On the evening of October 16, a P-3 air tanker on a ferry flight from Southern California to Missoula, Montana crashed near Missoula killing the two pilots. By October 21st, most fires were nearing containment and the western fire season was coming to a close.

Just as the western fire season was winding down, the Southern Area's fall fire season became very active. A Type I team was committed to the Piney Mountain fire on the George Washington National Forest and several Type II fires occurred in West Virginia, Tennessee, Daniel Boone National Forest, Cherokee National Forest, and the New River Gorge National Park. Five air tankers, two lead planes, 14 Type I crews and 4 Type II helicopters were used in the suppression of these fires. The Second United States Army mobilized one shower unit and one transportation unit for support of fires on the Cherokee National Forest.

November-December

Fire conditions continued to decline in early November in the South and by mid-month there was no significant fire activity. The Southern California fall fire season never became too active and there were no situations that required national mobilization support.

Summary

The 1991 fire season could be categorized as below normal to normal. Only 14 fires required Type I Incident Management Teams. In 1990 there were 28 such fires. 173 Type II crews were mobilized through NICC and most of these were mobilized in October. In 1990, 580 Type II crews and three battalions of military troops were mobilized. 10,877 fires were reported on National Forest system lands and burned 173,206 acres. 1991 didn't produce any severe dry lightning storms that historically present fire managers with the greatest problems. The potential for serious fire problems existed season-long in isolated areas of the West. 1991 was a very successful year. This success can be attributed to the recognition of a potentially serious year, accelerated fire preparedness actions, moisture regimes associated with most lightning storms, and most importantly, aggressive initial attack programs.

NATIONAL FORESTRY DATABASE PROGRAM

NATIONAL FORESTRY DATABASE PROGRAM

NATIONAL FORESTRY DATABASE PROGRAM

BACKGROUND - ISSUES

- NEED FOR A COMPREHENSIVE DATA SET
- NEED FOR TIMELINESS
- NEED FOR COMPARABILITY
- NEED FOR COMMITMENT FROM ALL PLAYERS (INCLUDING PROVINCES, INDUSTRY)
- NEED FOR AN EFFECTIVE PUBLIC INFORMATION PROGRAM

NATIONAL FORESTRY DATABASE PROGRAM

SUMMARY OF PROGRAM PROPOSAL

- OBJECTIVES
  - TO ESTABLISH A COMPREHENSIVE DATABASE
  - TO DEVELOP A PUBLIC INFORMATION PROGRAM
  - TO PROVIDE INFORMATION TO THE POLICY PROCESS

- PROGRAM STRUCTURE
  - IDENTIFY BASIC DATA SETS
  - CHOOSE A METHOD OF DATA REPORTING
  - ADDRESS TECHNICAL ISSUES
  - IDENTIFY CURRENT PUBLIC ISSUES

NATIONAL FORESTRY DATABASE PROGRAM

ORGANIZATION

- STEERING COMMITTEE
  - TO PROVIDE DIRECTION FOR DEVELOPMENT AND IMPLEMENTATION
  - CO-CHAIRED; FEDERAL AND PROVINCIAL/TERRITORIAL
  - CONCEPT OF TASK-SPECIFIC TECHNICAL SUBCOMMITTEES

NATIONAL FORESTRY DATABASE PROGRAM

ORGANIZATION

- ROLES

FORESTRY CANADA

- DESIGN, CONSTRUCTION, MANAGEMENT OF DATA SETS
- REPORTING
- PROVIDE LEADERSHIP FOR TECHNICAL PROGRAM
- PROVIDE SECRETARIAT TO STEERING COMMITTEE

PROVINCES AND TERRITORIES

- PROVIDE DATA FOR APPROVED PROJECTS
- PARTICIPATE IN TECHNICAL PROGRAM

NATIONAL FORESTRY DATABASE PROGRAM

DATA SETS

- Forest Inventory
- AAC
- Forest Fire - incidence data
- Insects and Diseases - incidence data
- Harvests - industrial roundwood (area and volume)
    - fuelwood
    - maple syrup
    - Christmas trees
- Silviculture - regeneration
    - tending
- Forest Management Expenditures
- Revenues - financial burden on forest industry

NATIONAL FORESTRY DATABASE PROGRAM

PROGRAM IMPLEMENTATION

- TEST RUN IN 1990-91 WITH 1989-90 DATA

- OPERATIONAL IN 1991-92 WITH 1990-91 DATA
    - DATA TO BE PROVIDED BY END SEPTEMBER
    - UNPUBLISHED FOLIOS AVAILABLE BY END DECEMBER
    - ANNUAL COMPENDIUM PUBLISHED BY END MARCH

NATIONAL FORESTRY DATABASE PROGRAM

TECHNICAL PROGRAM 1991-92

- Regeneration Results

- Private Lands

- Non-timber Values

NATIONAL FORESTRY DATABASE PROGRAM

COMMUNICATIONS PLAN

- THEMES AND MESSAGES
    - PARTNERSHIP
    - A COMPLEX ACTIVITY
    - A RIGHT TO KNOW
    - NON-TIMBER VALUES OF THE FOREST RESOURCES

- COMMUNICATIONS ACTIVITIES
    - DATA REPORTING
    - PUBLIC INFORMATION MATERIAL
    - EDUCATIONAL MATERIAL

NATIONAL FORESTRY DATABASE PROGRAM

FUTURE DIRECTIONS

- IMPLEMENTATION OF PROPOSALS FOR DATABASE EXPANSION AND ENHANCEMENT
- IMPLEMENTATION OF COMMUNICATIONS PLAN
- BROADER CONTACT WITH FOREST INDUSTRY
- NATIONAL FOREST ACCOUNT
- OTHER FEDERAL GOVERNMENT ACTIVITIES:
  - SOE REPORTING
  - ENVIRONMENT AND NATURAL RESOURCE ACCOUNTS

US FIRE RESEARCH

U.S. FIRE RESEARCH APPLICATIONS

ACCOMPLISHMENTS & PLANS

FIRE RESEARCH APPLICATIONS: ACCOMPLISHMENTS AND PLANS

Robert W. Mutch

January 1992

OCTOBER 2, 1991

FIRE RESEARCH TECHNOLOGY TRANSFER ACCOMPLISHMENTS IN FY91

INTRODUCTION

Because of the importance and urgency in applying new fire research knowledge to improve prescribed fire and fire suppression programs both nationally and internationally, Fire and Aviation Management and Fire Research established a new National Fire Research Applications Leader position at the Intermountain Fire Sciences Laboratory in Missoula, Montana. Although the position is located administratively within the Intermountain Station's Fire Behavior Project, the mission is to have this position facilitate the transfer of national fire research results to wildland management agencies on a global basis. Bob Mutch assumed the duties of this new position on February 11, 1991.

The objectives for this technology transfer effort are to:

1. Develop, coordinate, and implement a National Technology Transfer Plan for Fire Research.

2. Provide liaison between fire research scientists and national and international user groups regarding research application opportunities.

3. Transfer fire behavior and fire management research results to fire and resource managers and the public to better achieve management objectives and provide for the safety of people.

4. Serve as a consultant and advisor in the design, development, and conduct of national and international courses and workshops to ensure the transfer of new information.

5. Serve as a technical specialist and consultant to national and international resource management agencies to recommend solutions to complex fire management issues.

ACCOMPLISHMENTS

Technology transfer accomplishments for FY 91 will be reported for the five objectives:

1. DEVELOP, COORDINATE, AND IMPLEMENT A NATIONAL TECHNOLOGY TRANSFER PLAN.
   - An Annual Plan of Work for technology transfer was prepared and submitted on March 26, 1991.

2. PROVIDE LIAISON BETWEEN FIRE RESEARCH SCIENTISTS AND NATIONAL AND INTERNATIONAL USER GROUPS.
   - Attended National Fire Research Workshop in Macon, Georgia, in May.
   - Prepared first draft of Technology Transfer newsletter, "Interactions", in May.
   - Presented paper on "25 Years of Fire Behavior Prediction" to meeting of Fire Superevisors of the 20 northeastern states in June.
   - Made site visit to all fire research projects at the Riverside Fire Laboratory in June to discuss application opportunities.

3. TRANSFER FIRE BEHAVIOR AND FIRE MANAGEMENT RESEARCH RESULTS TO FIRE AND RESOURCE MANAGERS AND THE PUBLIC.

- Transferred new crown fire prediction technology to Fire Behavior Analysts nationally in June through an interagency workshop in Missoula and a mailing of materials to others.
- Published a paper on the Fire Behavior Service Center concept in July issue of Fire Management Notes for application in other Regions.
- Organized and conducted a technical exchange for physician Dr. Eric Villela from the firefighting department of the Federal District in Brasilia regarding programs for the safety, health, and welfare of wildland firefighters.
- Organized and conducted a fire management technical exchange in September for Claudia Rosa and Magna Luduvice from IBAMA in Brazil to review applicable fire research, fire management, and technology development programs in Montana.
- Reviewed wildland/urban interface problems in the vicinity of the Black Tiger Fire on the Boulder Ranger District, Arapahoe and Roosevelt National Forest; and discussed problems and solutions with the Boulder County Wildfire Mitigation Group. A public presentation was delivered in the evening on "Protecting People, Property, and Natural Resources at the Urban/Wildland Interface: Problems and Solutions". A brochure was distributed that transfers important fire safety information to the general public.
- Served on Steering Committee to design new wildland fire exhibit for the Visitor Center in Missoula, Montana, that will communicate an integrated fire management story to the general public.

4. DESIGN, DEVELOP, AND CONDUCT REGIONAL, NATIONAL, AND INTERNATIONAL TRAINING COURSES AND WORKSHOPS.

- Presented lesson on Continental Fire Regimes at Fire in Resource Management course at National Advanced Resources Technology Center (NARTC) in January.
- Presented lesson on new crown fire model at S-490 and S-590 at NARTC in March.
- Gave opening presentation on fire regimes and New Perspectives at Regional Fire Effects course at Northern Training Center, Montana.
- Presented lesson on Fire History and Fire Regimes at Fire Management for Line Officers at NARTC in April.
- Participated in National Fire Behavior Training Committee meeting at BIFC in May to review national fire behavior curriculum.
- Participated in planning to develop a national BEHAVE training course at the Northern Training Center in Montana.
- Designed and conducted training for national Fire Behavior Analysts at the Northern Training Center in Montana.
- Served on the interagency Steering Committee for the Fire in Resource Management course scheduled for 1992 at NARTC.
- Served on national Steering Committee to produce a "Fire in Wilderness Management" workshop in April 1993.

5. PROVIDE FIRE MANAGEMENT CONSULTATIONS TO NATIONAL AND INTERNATIONAL RESOURCE MANAGEMENT AGENCIES REGARDING COMPLEX ISSUES.

- Participated in fire management/fire research planning meeting with representatives from natural resource organizations in Brazil and the United States in Santa Fe, New Mexico, in March.
- Provided fire managment technical assistance to Brazil on a three week assignment in August as a member of a three person team.
- Participated in a joint management/research review of forest health issues in the Blue Mountains of Oregon; and organized the preparation of a white paper highlighting issues and management strategies to deal with an unprecedented level of forest mortality.
- Arranged through the Brazilian Aeronautical Commission for the free shipment of firefighting tools and 1100 pounds of foam concentrate from Andrews Air Force Base to Rio de Janeiro for use by wildland firefighters in Brazil.

Robert W. Mutch
Research Applications Leader

DRAFT

December 13, 1991

1992 ANNUAL PLAN OF WORK FOR BOB MUTCH FOREST FIRE RESEARCH APPLICATIONS

This Annual Plan of Work for the transfer of fire research results to user agencies and organizations will be covered under five major sub-divisions:

1. DEVELOP, COORDINATE, AND IMPLEMENT A NATIONAL TECHNOLOGY TRANSFER PLAN.

   - o Complete draft of Technology Transfer Plan by January 31, 1991.

2. PROVIDE LIAISON BETWEEN FIRE RESEARCH SCIENTISTS AND NATIONAL AND INTERNATIONAL USER GROUPS.

   - o Prepare publication draft of "25 Years of Fire Behavior Prediction" with Dick Rothermel.

   - o Serve as invited participant at the November workshop on "National Parks Fire Policy: Goals, Perceptions, and Reality", sponsored by the Renewable Natural Resources Foundation.

   - o Participate in National Fire Research meeting in California in June.

   - o Make presentation to interagency users on National Fire Research Program at NARTC in April.

3. TRANSFER FIRE BEHAVIOR AND FIRE MANAGEMENT RESEARCH RESULTS TO FIRE AND RESOURCE MANAGERS AND THE PUBLIC.

   - o Serve on National Steering Committee to produce a new edition of the fire effects "rainbow series" to transfer fire effects information to users.

4. DESIGN, DEVELOP, AND CONDUCT REGIONAL, NATIONAL, AND INTERNATIONAL TRAINING COURSES AND WORKSHOPS.

   - o Deliver a paper on "The Big Picture: Fire Management in the 1990's" at the Fire Management in New Perspectives Workshop in Coeur d'Alene, Idaho, in November.

   - o Serve as a Steering Committee member, Unit Leader, and faculty member for the Fire in Resource Management course at NARTC in April.

   - o Deliver a paper on "Successful Prescribed Fire Programs in Forests" at the January conference titled Fire in Pacific Northwest Ecosystems: Exploring Emerging Issues.

   - o Serve as a faculty member at the Prescribed Natural Fire course, Northern Training Center, January 1992.

- Serve as a faculty member at the Fire for Agency Administrators course at NARTC in February.

- Present a lesson on Prescribed Fire to Local Agency Administrators, Northern Training Center, February 1992.

- Present a Case Study on Ponderosa Pine at the workshop titled "Fire Restoration in Rocky Mountain Ecosystems", Estes Park Convention Center, Colorado, February 1992.

- Participate in Fire Behavior Analyst's Workshop in Region 3 in February.

- Present lesson titled "Fire in the Third Dimension" at S-490 course, Northern Training Center, March 1992.

- Facilitate the development of a national BEHAVE training program with personnel at the Northern Training Center.

- Serve on national Steering Committee to produce a "Fire in Wilderness Management" workshop in April 1993.

- Participate in faculty meeting for national Prescribed Fire Management 590 course at NARTC in May.

5. PROVIDE FIRE MANAGEMENT CONSULTATIONS TO NATIONAL AND INTERNATIONAL RESOURCE MANAGEMENT AGENCIES REGARDING COMPLEX ISSUES.

- Serve as expert witness for law suits related to the 1990 Turkey Fire on the Lewis and Clark National Forest.

- Continue consultations in Pacific Northwest Region regarding forest health and fire management strategy issues in Oregon.

ROBERT W. MUTCH
Research Applications
Leader